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NOTES

ON

CHALCIDIÆ.

PART I.—EURYTOMIDÆ.

BY

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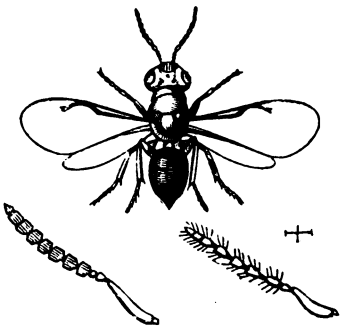
NOTES ON CHALCIDIÆ.

Fig. 1.

Fig. 2.



The two figures here inserted represent (1) Isosoma flavicollis and (2) Eurytoma platyptera, engraved from the original drawings by the late A. H. Haliday.

Part I.—EURYTOMIDÆ.

In the 'Zoologist' for January, 1871, there are some extracts relative to the habits of Isosoma, a genus of the Eurytomidæ, the

latter a family of the tribe of Chalcidiæ. The investigation of the connecting links or debateable species between genera is very interesting, and there are instances of these intermediate forms in the Eurytomidæ. The following notes on these and on other species are preceded by a Synopsis of the British families of Chalcidiæ, and of the British genera of Eurytomidæ, and by a notice of the variation of structure in the British species of Isosoma.

A. Tarsi 5-jointed.
a. Hind femora much incrassated. ... ... 1. Chalcididæ.
b. Hind femora not or slightly incrassated.
* Sides of the mesopectus with cavities. Middle tibiæ usually with not very stout apical spines.
† Antennæ seated somewhat above the mouth.
‡ Thorax very gibbous. ... ... 4. Perilampidæ.
‡‡ Thorax not very gibbous.
§ Prothorax well developed, subquadrate or attenuated and conical.
+ Cubitus extremely short.
o Abdomen with a peculiar sculpture, cylindrical in the male, conical and with no prominent oviduct in the female. ... 5. Ormyridæ.
oo Abdomen with no peculiar sculpture, more or less compressed in the male, with a prominent oviduct in the female. ... ... 2. Torymidæ.
++ Cubitus not very short.
o Prothorax subquadrate. Abdomen slightly compressed, convex above. ... ... 3. Eurytomidæ.
oo Prothorax elongated, conical. Abdomen flat above. Hind tibiæ with stout spines. ... 9. Cleonymidæ.
§§ Prothorax not much developed, short, transverse.
x Abdomen petiolated. ... ... 13. Sphegigasteridæ.
xx Abdomen sessile.
o Antennæ moniliform. ... ... 12. Hormoceridæ.
oo Antennæ filiform, cylindrical or clavate.
-+ Scutellum small. ... ... 14. Pteromalidæ.
-+-+ Scutellum very large. ... ... 15. Eunotidæ.
†† Antennæ seated at the border of the mouth.
‡ Antennæ elongated, more than 10-jointed. 10. Spalangidæ.
‡‡ Antennæ short, 10-jointed. ... ... 11. Pirenidæ.
** Sides of the pectus without cavities. Middle tibiæ with a very short apical spine.
† Antennæ with more than eight joints.

‡ Mesothorax contracted before the scutellum; disk not bordered. ... ... 8. Eupelmidæ.
‡‡ Mesothorax not contracted before the scutellum; disk strongly bordered behind. ... 6. Encyrtidæ.
†† Antennæ with not more than eight joints. 7. Myinidæ.
B. Tarsi 4-jointed.
a. Ulna uninterrupted and passing into the costa with a gentle curve.
* Four hinder femora flat, compressed, much developed. ... ... 16. Elasmidæ.
** Four hinder femora not flat.
† Parapsides distinctly separated. ... ... 17. Elachistidæ.
†† Parapsides not separated. ... ... 18. Eulophidæ.
b. Ulna interrupted before it joins the costa.
* Radius extending to half the length of the wing. ... ... 19. Eutedonidæ.
** Radius not extending to half the length of the wing. ... ... 20. Tetrastichidæ.
C. Tarsi 3-jointed. ... ... 21. Trichogrammidæ.

To these may be added the Tetracampidæ, which will be noticed on another occasion.

The genera of Eurytomidæ have been distinguished as follows:—

A. Hind tibiæ with some rows of fine setæ. ... 4. Decatoma.
B. Hind tibiæ without setæ.
a. Prothorax and mesothorax thickly covered with large punctures. ... ... 1. Eurytoma.
b. Prothorax and mesothorax not roughly punctured.
* Metathorax perpendicularly shortened. ... 2. Systole.
** Metathorax not abruptly contracted. ... ... 3. Isosoma.

Some species of the family require to be especially remarked, as they apparently connect the genera Eurytoma and Isosoma.

There are several British species of Isosoma yet undescribed; variations of structure in the species already recorded are indicated in the following lists.

The differences of length and thickness in the antennæ of the male are indicated by the five following groups of species:—

Group 1.—I. longicornis, breviventris, dissimilis. Group 2.—I. verticillata, crassicornis, angustipennis, brevis. Group 3.—I. petiolata, cornuta, vacillans, minor, tenuicornis, pusilla. Group 4.—I. Nepe. Group 5.—I. brevicornis.

The antennæ of the female decrease in length, in thickness, and in the clavate form, according to the following order:—

Length.—I. depressa, Laothoe, attenuata, hyalipennis, verticillata, tenuicornis, linearis, fulvicollis, flavicollis, angustata, angustipennis, crassicornis.

Thickness.—I. crassicornis, verticillata, attenuata, fulvicollis, flavicollis, angustipennis, tenuicornis, angustata, Laothoe, hyalipennis, linearis, depressa.

Clavate form.—I. attenuata, fulvicollis, flavicollis, linearis, tenuicornis, crassicornis, verticillata, angustipennis, angustata, Laothoe, hyalipennis, depressa.

In the prothorax the characteristics of convexity, breadth, roughness, size of the humeral spots and depth of colour of these spots decrease in the following order:—

Convexity.—I. verticillata, crassicornis, longicornis, angustipennis, vacillans, Nepe, petiolata, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, dissimilis, brevicornis, angustata, fulvicollis, flavicollis, hyalipennis, brevipennis, linearis, Laothoe, attenuata.

Breadth. — I. longicornis, angustipennis, Laothoe, attenuata, verticillata, crassicornis, petiolata, brevicornis, angustata, fulvicollis, flavicollis, vacillans, Nepe, linearis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, dissimilis, hyalipennis, brevipennis.

Roughness.—I. verticillata, crassicornis, hyalipennis, brevipennis, petiolata, brevicornis, angustipennis, vacillans, Nepe, longicornis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, dissimilis, angustata, fulvicollis, flavicollis, linearis, Laothoe, attenuata.

Size of the humeral spots.—I. depressa, Laothoe, attenuata, linearis, longicornis, angustata, fulvicollis, flavicollis, vacillans, petiolata, dissimilis, Nepe, crassicornis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, hyalipennis, brevipennis, angustipennis, verticillata, brevicornis.

Depth of colour of these spots.—I. angustipennis, verticillata, crassicornis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, hyalipennis, brevipennis, vacillans, Nepe, linearis, petiolata, dissimilis, angustata, fulvicollis, flavicollis, longicornis, Laothoe, depressa, attenuata.

The diminution of convexity and of roughness in the mesothorax and of obtuseness in the tip of the scutellum is expressed in the following series:—

Convexity. — I. verticillata, petiolata, hyalipennis, crassicornis, Nepe, brevicornis, Laothoe, depressa, linearis, angustata, longicornis, vacillans, dissimilis, attenuata, brevipennis, angustata, angustipennis,

cornuta, brevis, minor, pusilla, tenuicornis, breviventris, fulvicollis, flavicollis.

Roughness. — I. verticillata, petiolata, hyalipennis, crassicornis, Nepe, brevicornis, Laothoe, depressa, longicornis, vacillans, dissimilis, attenuata, brevipennis, linearis, angustata, angustipennis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, fulvicollis, flavicollis.

Obtuseness of the tip of the scutellum.—I. verticillata, petiolata, hyalipennis, longicornis, vacillans, dissimilis, attenuata, brevipennis, angustata, angustipennis, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, fulvicollis, flavicollis, crassicornis, Nepe, brevicornis, Laothoe, depressa, linearis.

The metathorax is successively less dull and decumbent and punctured in the following series;—

Dull and decumbent.—I. verticillata, crassicornis, vacillans, brevicornis, Nepe, petiolata, cornuta, angustata, depressa, brevipennis, attenuata, linearis, Laothoe, hyalipennis, brevis, minor, pusilla, tenuicornis, breviventris, fulvicollis, flavicollis, angustipennis, longicornis, dissimilis.

The preceding series will express the successive diminution of punctures, except that I. fulvicollis and flavicollis should precede I. brevis.

In the following species the metathorax is furrowed;—I. verticillata, crassicornis, vacillans, brevicornis, depressa, brevipennis, attenuata, linearis, Lathoe, hyalipennis, brevis, minor, pusilla, tenuicornis, breviventris, fulvicollis, flavicollis.

In the following species it is not furrowed:—I. Nepe, petiolata, cornuta, angustata, angustipennis, longicornis, dissimilis.

In the following species it is excavated:—I. verticillata, crassicornis, vacillans, brevicornis, Nepe, petiolata, cornuta, angustata, brevis, minor, pusilla, tenuicornis, breviventris, angustipennis, longicornis, dissimilis.

In the following species it is not excavated:—I. depressa, brevipennis, attenuata, linearis, Laothoe, hyalipennis.

The following series shows the successive diminution of length of the petiole:—I. petiolata, cornuta, verticillata, brevis, vacillans, Nepe, dissimilis, longicornis, angustipennis, crassicornis, minor, tenuicornis, pusilla, breviventris, angustata, fulvicollis, flavicollis, depressa, linearis, Laothoe, hyalipennis, attenuata, breviventris, brevicornis.

The abdomen successively diminishes in length and convexity as follows:—

Male. Length.—I. verticillata, longicornis, angustipennis, vacillans, brevis, cornuta, minor, pusilla, tenuicornis, brevicornis, Nepe, petiolata,

breviventris, dissimilis, crassicornis. Convexity.—I. verticillata, longicornis, petiolata, crassicornis, angustipennis, Nepe, cornuta, vacillans, brevis, minor, pusilla, tenuicornis, breviventris, dissimilis, brevicornis.

Female. Length.—I. depressa, attenuata, Laothoe, angustata, angustipennis, flavicollis, fulvicollis, minor, pusilla, hyalipennis, linearis, brevipennis, verticillata, crassicornis. Convexity.—I. verticillata, crassicornis, angustipennis, hyalipennis, attenuata, brevipennis, Laothoe, flavicollis, minor, pusilla, angustata, fulvicollis, linearis, depressa.

Successive diminution of the angle beneath the abdomen in the female.—I. verticillata, angustipennis, minor, pusilla, angustata, depressa, Laothoe, hyalipennis, attenuata, flavicollis, crassicornis, fulvicollis, linearis, brevipennis.

The abdominal segments successively decrease in length according to the following series:—

First segment.—I. crassicornis, Nepe, brevis, breviventris, attenuata, vacillans, fulvicollis, verticillata, longicornis, angustipennis, petiolata, cornuta, minor, pusilla, tenuicornis, dissimilis, linearis, hyalipennis, brevipennis, brevicornis, flavicollis, angustata, depressa, Laothoe.

Second segment.—I. longicornis, cornuta, petiolata, dissimilis, brevicornis, fulvicollis, flavicollis, depressa, linearis, Laothoe, verticillata, angustipennis, vacillans, Nepe, brevis, minor, pusilla, tenuicornis, breviventris, angustata, hyalipennis, attenuata, crassicornis, brevipennis.

Third segment.—I. crassicornis, attenuata, verticillata, angustipennis, vacillans, Nepe, petiolata, minor, pusilla, breviventris, brevicornis, Laothoe, brevipennis, longicornis, hyalipennis, cornuta, brevis, tenuicornis, dissimilis, angustata, depressa, flavicollis, linearis, fulvicollis.

Fourth segment.—I. vacillaus, Nepe, Laothoe, dissimilis, linearis, brevipennis, cornuta, fulvicollis, flavicollis, depressa, angustipennis, brevicornis, angustata, hyalipennis, attenuata, longicornis, petiolata, brevis, minor, pusilla, tenuicornis, breviventris, verticillata, crassicornis.

Fifth segment.—I. depressa, fulvicollis, flavicollis, hyalipennis, petiolata, brevicornis, angustata, Laothoe, attenuata, brevipennis, verticillata, longicornis, brevis, minor, pusilla, tenuicornis, breviventris, vacillans, dissimilis, linearis, crassicornis, longicornis, angustipennis, Nepe, cornuta.

Sixth segment.—I. verticillata, linearis, petiolata, angustata, fulvicollis, flavicollis, hyalipennis, attenuata, Laothoe, brevipennis, crassicornis, longicornis, angustipennis, vacillans, Nepe, cornuta, brevis, minor, pusilla, tenuicornis, breviventris, dissimilis, brevicornis, depressa.

In the vein of the fore wing of the Chalcidiæ the humerus is basal and subcostal, and is succeeded by the ulna, which is costal, and emits the cubitus towards the disk and is succeeded along the costa by the radius.

The ulna and the radius successively decrease in length according to the following series:—

Ulna.—I. angustipennis, Nepe, brevis, minor, pusilla, angustata, verticillata, petiolata, cornuta, tenuicornis, attenuata, longicornis, dissimilis, breviventris, depressa, linearis, hyalipennis, brevipennis, crassicornis, vacillans, brevicornis, fulvicollis, flavicollis, Laothoe.

Radius.—I. Laothoe, vacillans, brevicornis, fulvicollis, flavicollis, breviventris, depressa, hyalipennis, verticillata, crassicornis, brevicornis, cornuta, pusilla, tenuicornis, dissimilis, linearis, attenuata, angustipennis, Nepe, petiolata, brevis, minor, angustata, brevipennis.

I am indebted to the kindness of Mr. Saunders, of Ontario, Canada, for specimens of Isosoma Vitis, which is mentioned in the 'Zoologist' as being cradled in grape stones. All the species of Isosoma that have been discovered in Europe and in Madeira are distinguished by two humeral spots: these do not occur in the American species nor in those of Australia. The male of I. Vitis seems to have all the characters of Eurytoma, and thus removes the partition between the two genera; the female most resembles I. depressa in structure.

Of the four Australian species which have been recorded as belonging to this genus, I. Volux and I. Oritias also resemble Eurytoma as regards the male; the female of I. Olbus is very like I. Vitis in structure, and the male of I. Ravola resembles in structure the British species of Isosoma, but has stouter antennæ.

The species of Isosoma in Europe and in Madeira possess a fuller development of the characters of the group than those of America and of Australia, and are less nearly connected with Eurytoma. Such also is the case with the following new genus of Eurytomidæ, for specimens of which I am indebted to the late A. H. Haliday, who found them in straw roofs near Lucca, Italy. Whether the eggs are deposited in roofs or are carried there with the straw from the fields has yet to be ascertained.

Genus PHILACHYRA, *Haliday, MS.*

Mas.—Corpus gracile, nitens, longiusculum. Caput et prothorax subpunctata. Caput prothorace paullo latius. Antennæ 11-articulatæ, subfiliformes, verticillato pilosæ, basi geniculatæ; articuli 3us et 4us minimi. Prothorax subquadratus. Metathorax postice attenuatus. Petiolus brevissimus. Abdomen glabrum, planum, lineare, thorace multo brevius. Pedes graciles, longiusculi. Alæ longæ. *Fœm.*—

Aptera. Caput prothorace multo latius. Antennæ subclavatæ. Abdomen fusiforme, convexum. Femora subincrassata.

Male.—Body slender, elongate, convex, not high nor tumid. Head and prothorax shining and somewhat smooth, being much less punctured than they are in Isosoma. Head a little broader than the prothorax. Antennæ 9-jointed, exclusive of the divisions of the club and of the two ring-shaped joints that follow the second; second joint much shorter than the first, with which it forms a slight angle; third and following joints with thin whorls of hair, successively decreasing in length; third much longer than the second. Prothorax subquadrate. Metathorax long, tapering hindward. Petiole very short. Abdomen flat, linear, smooth, apparently subsessile, much shorter than the thorax and mnch narrower than the fore part of the latter. Legs slender, rather long. Fore wings long; ulna much shorter than the hnmerus; radius a little shorter than the cubitus and not more than one-third of the length of the ulna; stigma very small. *Female.* — Wingless. Head much broader than the prothorax. Antennæ subclavate. Thorax smoother than that of the male. Abdomen fusiform, convex, as broad as the thorax, and equal to it in length. Femora slightly incrassated, stouter than those of the male.

PHILACHYRA IPS, *Haliday, MS.*

Mas. — Nigra, prothoracis maculis duabus tibiis anticis apice genubus tarsisque fulvis, alis diaphanis. *Fœm.*—Antennis basi trochanteribus femoribus anticis apice genubus tarsisque luteis.

Male.—Black. Prothorax with a tawny spot on each fore angle. Fore tibiæ towards the tips, knees and tarsi tawny. Wings pellucid; veins tawny. *Female.*—First joint of the antennæ, trochanters, fore femora towards the tips, knees and tarsi luteous, the latter black towards the tips. Hind part of the abdomen thinly beset with white hairs. Length of the body 1—1¼ line.

A. H. Haliday wrote thus to me of the male of this species:—'Two questions arise; first, is it the true male? I found it, though beginning to appear later than the female, yet earlier than any known species of Isosoma came out, and in the same situation with the female still continuing. Second, are the characters, antennæ and proportions of the segments of the wing-vein sufficient to distinguish it from Isosoma?"

Perhaps the opinions in the two following extracts from Dr. Walsh's publications will be found to be not quite correct:—

"If Eurytoma Hordei could with any propriety be referred to that genus, we should then have a case of the same genus including both parasitic and plant-feeding species; and I do not believe that any

such violation of the great law of the unity of habits can be met with anywhere in nature.

"Certainly, if preceding authors had referred this species to its proper genus (it was referred to Isosoma in 1843) I should not have been so unwilling to believe in its being a true vegetable-feeder. As soon as I became personally acquainted with it the mystery was solved at once."

The female of I. Hordei resembles the female of I. Vitis in structure, but the male, as appears by the figure in the 'American Entomologist,' vol. ii. p. 330, differs widely from that of I. Vitis, and approaches much nearer to the typical species of Isosoma.

The immense nnmber of species in the Chalcidiæ, and the numerous instances of very close mutual resemblance in their forms, afford large materials for research and for debates whether the differences are of specific character or mere variations, and one more extract from Dr. Walsh's works will show his opinion with regard to the words *species* and *variety*. In a notice of the forms of Eurytoma he says, "Whether they be really varieties, or whether they be distinct species, depends—according to my view—upon the difficult and almost insoluble question," &c. He distinguishes Eurytoma and Isosoma by some characters which are not mentioned by Foerster, who first gave a detailed description of the differences between the two genera. His distinctions apply clearly to the typical species of each genus, such as E. plumata and I. verticillata, but there are other species in which these distinctions can hardly be traced. The distinctions are as follows:—

EURYTOMA.—Body partially contractile, with a deep finely sculptured groove for the reception of the middle femora reaching from the base of the middle coxa to a point immediately beneath the insertion of the front wing. Antennæ 8-jointed, 9-jointed in E. gigantea.

DECATOMA.—Body contractile, as in Eurytoma, and with a similar groove for the middle femora. Antennæ of the male 7-jointed, filiform, the club slightly compressed. Antennæ of the female 8-jointed, gradually clavate, the club considerably compressed.

ISOSOMA.—Body not contractile and with no groove to receive the middle femora. Antennæ 9-jointed.

Dr. Foerster distinguishes Decatoma from Eurytoma and from Isosoma by the bristles on the hind tibiæ of the former genus, but this character is insufficient to distinguish several of the species.

Dr. Walsh continues his remarks on the Eurytomidæ as follows:—"It is a very general law in Chalcidiæ that each successive pair of legs is more and more marked with black." "And so with other families of insects; each will be found to be marked according

to certain general coloration laws." The fore tarsi of Chalcidiæ are most usually darker than the four posterior tarsi. Dr. Walsh considers this as a decisive proof of a common origin and as adverse to the doctrine that every species was independently created. The "certain definite colorational pattern" is very conspicuous in the Eurytomidæ, and includes them under one head, which may be said to be primarily represented by Eurytoma. The other three genera, Systole, Decatoma and Isosoma, have much more affinity to Eurytoma than they have to each other. The antennæ of Eurytoma are stated by Dr. Walsh to be 8-jointed, with the exception of E. gigantea, in which they are 9-jointed. The antennæ of Isosoma are said by him to be 9-jointed, and those of Decatoma 7-jointed in the male and 8-jointed in the female, omitting the two very minute joints that follow the second, and considering to be only one joint. But these apparent differences may be owing to the structure of the club, of which the divisions are in some species contracted into one joint and in others they form three distinct joints. The joints of the antennæ of the male in the more typical species of Eurytoma are dilated on one side; in others they are equal, like those of Isosoma and of Decatoma. Isosoma has not the semicontractile and compressed body of Eurytoma and Decatoma, but in some species, such as E. Cestius, E. atra, and E. Philager, the body is like that of Isosoma in structure. The colour of the body in Eurytoma is black, but in E. bicolor, a North American species, it has the "colorational pattern" which characterizes Decatoma, and in E. Philager, a South American species, there are two pale humeral spots like those of the European species of Isosoma. In Decatoma the ground hue of the more typical species is black, but in the whole series of species this hue changes by degrees to yellow; the pale marks appear first on the head and on the prothorax and thence spreads over the rest of the body, which in some species is wholly yellow, and especially so in D. Orctilia and in D. Diphilus, of which the first inhabits the West Indies and the second South America. Others, in which the yellow hue prevails, resemble some species of Megastigmus, a genus of Torymidæ, in the markings, and the latter have also a quadrate prothorax like the Decatomæ. The typical species of Decatoma, both in Europe and in North America, are parasitic on the Cynipidæ of oak-galls, and they also agree in having a black band on the fore wing. Cynips lignicola, the dweller in the well-known Devonshire gall, brought with it into England two parasites, Callimome Devoniensis and a Decatoma. This Callimome has a long oviduct, which can reach the centre of the gall in which the grub is cradled, but such is not the case with the Decatoma. The mode of oviposition of these two species has not, I believe, been yet described in England. In Isosoma the "colorational pattern" is different from that of Decatoma and of Eurytoma bicolor. All the species are black; those

of Europe have a pale spot on each side of the fore border of the prothorax, and in two of them the prothorax is wholly yellow. Their power in leaping is very slight as compared with that of most of the Chalcidiæ.

Dr. Walsh, in his Essay on the Eurytomidæ, says, "In several cases Eurytomidous forms, that appear to belong to the same species, present more or less constant differences when they infest different species of insects. Such forms seem to deserve a distinctive name, which I have accordingly given to them—classifying them as mere varieties." He adds, "If such a so-called variety confines itself exclusively to that particular insect which it is actually found to infest, then I should infer that it cannot interbreed habitually with the other forms referred to the same so-called species; because, if it did so, it would inevitably, by the Laws of Inheritance, acquire a propensity to attack all the different insects which are attacked by the other forms provisionally referred to the same species. Consequently, upon this latter supposition, I should pronounce such a so-called variety to be in reality a distinct species." There are instances of a species of Chalcididæ being parasitic on several very different insects, without showing any variation. Some other observations of Dr. Walsh indicate that he considers difference of size in varieties or species to be owing to the difference in size of the insects which they infest; for instance, E. plumata, the largest European species of Eurytoma, that inhabits the large galls formed by Urophora Cardui on thistle-stalks, thereby excels in size the very small Eurytoma (E. curta?) that emerges from the little galls on Rosa spinosissima.

Since the notes on Isosoma were published in the 'Zoologist' I found a passage in Nees ab Esenbeck's Hym. Ich. aff. Monogr. vol. 2, which shows that Dr. Nees discovered one of the Eurytomidæ to be herbivorous in 1834. In his description of Eurytoma Rosæ, p. 415, he observes that he formerly confounded it with E. (Isosoma) verticillata, and that he had ascertained it to be the maker of the galls of Rosa centifolia. In p. 431 he describes Eulophus Eurytomæ, a parasite of the above species, which from his description is certainly a Eurytoma, not an Isosoma, and is a proof that the Eurytomæ are not all parasitic. Whether one species of this family is sometimes parasitic on other insects and sometimes herbivorous, and has thus the choice of two ways of perpetuating its existence, has yet to be ascertained. E. Rosæ is not the Eurytoma of Rosa spinosissima before mentioned. This Eurytoma and one of the Cynips tribe dwell in the same galls, but the gall-fly may be one of the "Inquilinæ," and not a victim of the Eurytoma.

Fossils have been termed medals of creation, and, according to Dr. Walsh and others, insects, by means of their differences and affinities, are living medals which illustrate a long succession of earlier epochs.

Thus, the distinctive characters of two species of Eurytoma acquired by cumulative modification since the time of their extinct ancestor are indicative of a comparatively recent epoch; the difference between Eurytoma and Decatoma shows an earlier time; the wider difference between Eurytoma and Isosoma recalls a still earlier time; and the remote affinity of Axima and of Aiolomorphus to the other Eurytomidæ signifies very distant ages. Axima spinifrons, the only species of that genus, inhabits South America, and has a very broad head, a front with two spines, very prominent eyes, and a short cubitus, like that of the Chalcididæ and of the Torymidæ.

Genus AIOLOMORPHUS.

Mas. Corpus gracile, convexum, subtiliter punctatum. Caput breve, transversum, thoraci æquilatum; frons erecta. Oculi parvi, subprominuli. Palpi breves. Antennæ longæ, graciles; flagelli articuli longissimi, setulosi. Prothorax magnus, subquadratus. Mesothorax breviusculus; parapsidum suturæ bene determinatæ. Metathorax longiusculus, subdeclivis. Petiolus longus, gracilis, punctatus. Abdomen glabrum, clavatum, subcompressum. Pedes graciles; tibiarum calcaria brevissima; tarsi 5-articulati.

Male. Body slender, convex. Head and thorax finely punctured. Head short, transverse, as broad as the thorax; front erect. Eyes small, slightly prominent. Mandibles small. Palpi short. Antennæ filiform, slender, pubescent, seated in the middle of the front, longer than the thorax, mutilated in the specimen described; first joint long; second short; third, fourth and fifth very long, thickly beset with short bristles on each side. Thorax thickly and minutely punctured. Prothorax large, subquadrate. Mesothorax rather short; sutures of the parapsides strongly marked; scutellum rather small. Metathorax elongate, slightly decumbent. Petiole slender, punctured, as long as the hind coxæ. Abdomen smooth, shining, clavate, slightly compressed, a little longer than the thorax exclusive of the petiole. Legs slender, moderately long; tibiæ with very short apical spurs; tarsi 5-jointed; joints from the first to the fourth successively decreasing in length. Wings moderately long and broad; ulna about one-third of the length of the humerus; radius much shorter than the ulna, longer than the cubitus; stigma small; spurious veins such as the brachial and the cubital well-defined.

This genus has a remarkable structure. In the development of the spurious wing-veins it differs from all the other Chalcidiæ, with the exception of the Leucospidæ and of some genera that appear to be related both to the Chalcidiæ and to the Cynips tribe. It has very little affinity to the Leucospidæ and to the Chalcididæ; it is nearer

to the Sphegigasteridæ and still nearer to the Eurytomidæ, but, like Axima, it is very remote from the centre of attraction round which the other Eurytomidæ are clustered. The marks on the prothorax correspond to somewhat similar marks on the prothorax of the European species of Isosoma.

A. RHOPHALOIDES. *Mas.*—Niger, cinereo subpubescens; prothorax callis duobus anticis lateralibus transversis luteis; abdomen basi rufum; pedes lutei; alæ cinereæ, nigro venosæ.

Male.—Black, with slight cinereous pubescence. Prothorax with a large transverse luteous callus on each side of the fore border. Abdomen red towards the base; the red hue occupying most space on the under side. Legs luteous. Wings cinereous; veins black. Length of the body 4 lines.

Hong Kong.

Genus EURYTOMA.

Ratzeburg considers Eurytoma, Isosoma and Decatoma as one genus, and it is difficult to identify the species which he describes as new. All appear to be Eurytomæ or Decatomæ, and their names are as follows:—E. flavovaria, flavoscapularis, Eccoptogastri, Abieticola, Ischioxanthos, aciculata, striolata, costata, extincta and Pinetorum.

E. INSIGNIS.—*Mas.* Nigra, fortiter punctata; antennæ submoniliformes, thorace paullo breviores, articulis sublinearibus non dilatatis, clava sublanceolata; petiolus longiusculus; abdomen glabrum, parvum; pedes flavescentes, tibiis posticis femoribusque nigris basi apiceque flavescentibus; alæ diaphanæ, nigro-venosæ. *Fœm.* — Antennæ thorace multo breviores; abdomen thorace paullo brevius.

Male.—Black. Head and thorax largely punctured. Head broader than the thorax. Antennæ submoniliform, a little shorter than the thorax; joints from the third to the seventh nearly linear, verticillate, pilose, not dilated on one side; club sublanceolate, very much longer than the seventh joint. Petiole rather long. Abdomen compressed, very much shorter and narrower than the thorax. Legs yellowish; femora and hind tibiæ black, yellowish at the base and at the tips. Wings pellucid; veins black; ulna thick, less than half the length of the humerus; radius very much shorter than the ulna, a little longer than the cubitus. Length of the body 1¾ line.

Female.—Antennæ much shorter than the thorax. Abdomen a little shorter than the thorax. Length of the body 2¼ lines.

The ulna is darker and thicker than that of E. nodularis and of

E. plumata: from the latter species, which it rivals in size, it differs in the structure of the antennæ.

England. In Dr. Chapman's collection.

E. MELANONEURA.—*Fœm.* Nigra, robusta, fortiter punctata: antennæ subclavatæ, breves; abdomen glabrum, subfusiforme, thorace brevius, apice lanceolatum; pedes nigri, femoribus basi genubus tarsisque fulvis, tarsis anticis piceis; alæ diaphanæ, nigro venosæ.

Female.—Black, stout. Head and thorax largely punctured. Head a little broader than the thorax. Antennæ subclavate, much longer than the breadth of the head. Abdomen shorter than the thorax, subfusiform except the apical part, which is lanceolate. Femora tawny towards the base; knees and tarsi tawny; fore tarsi piceous. Wings pellucid; veins black; ulna thick, about one-fourth of the length of the humerus; cubitus about half the length of the ulna, rather shorter than the radius. Length of the body $1\frac{2}{3}$ line.

The longer abdomen distinguishes it from E. tumida.

Barnstaple. In the collection of the Rev. T. A. Marshall.

Genus ISOSOMA.

I. CLAVICORNIS.—*Fœm.* Nigra, subtiliter punctata; antennæ clavatæ, breves; prothorax fulvo bimaculatus; abdomen glabrum, subfusiforme, thorace non longius; pedes nigri, genubus tarsisque fulvis; alæ albæ, venis pallide testaceis.

Female. Black. Head and thorax finely punctured. Head a little broader than the thorax. Antennæ clavate, a little longer than the breadth of the head. Prothorax with two tawny humeral spots. Abdomen nearly fusiform, not longer than the thorax, with a few white hairs towards the tip. Knees and tarsi tawny. Wings white: veins pale testaceous; ulna less than half the length of the humerus; radius a little more than half the length of the ulna; cubitus a little less than half the length of the ulna. Length of the body $1\frac{1}{4}$ line.

The comparatively long abdomen distinguishes it from I. verticillata, crassicornis, hyalipennis, angustata; the stouter body from I. minor, attenuata, pusilla, breviventris, tenuicornis; the shorter and more clavate antennæ from I. linearis, Laothoe; the broader fore wings from I. angustipennis; the paler wings from I. depressa; the paler wing-veins from I. brevicornis, petiolata, longicornis, cornuta, brevis, Nepe, vacillans.

England.

I. MELANOMERA.—*Mas.* Nigra, gracilis, subtiliter punctata; antennæ corpore paullo breviores; prothorax piceo bimaculatus;

abdomen glabrum, fusiforme, thorace multo brevius et angustius; genua fulva; tarsi picei; alæ subfuliginosæ, piceo venosæ.

Male. Black, slender. Head and thorax finely punctured. Antennæ a little shorter than the body; third and following joints long, nearly linear. Prothorax with two piceous humeral spots. Abdomen fusiform, much shorter and narrower than the thorax. Knees tawny; tarsi piceous. Wings slightly smoky; veins piceous; ulna much more than half the length of the humerus; cubitus longer than the radius, about one-fourth of the length of the ulna. Length of the body 1¼ line.

The more moniliform antennæ and the darker tarsi distinguish it from I. verticillata.

England.

I. CLARIPENNIS. — *Mas.* Nigra, subtiliter punctata; antennæ thorace multo longiores, articulis fusiformibus petiolatis; prothorax fulvo bimaculatus; abdomen glabrum, fusiforme, thorace multo brevius; genua fulva; tarsi nigri; alæ albæ, piceo venosæ.

Male. Black. Head and thorax finely punctured. Head broader than the thorax. Antennæ much longer than the thorax; joints from the fourth to the eighth fusiform, with long whorls of hairs and with rather long petioles; third joint much longer and stouter than the fourth. Prothorax with two tawny humeral spots. Abdomen fusiform, much shorter than the thorax. Knees tawny; tarsi black. Wings white; veins piceous; ulna much shorter than the humerus; cubitus longer than the radius, about one-fourth of the length of the ulna. Length of the body 1⅓ line.

It may be distinguished from I. petiolata by the smaller humeral spots, by the shorter petiole, and by the darker tarsi.

England.

I. TENUIPES.—*Mas.* Nigra, gracillima, subtilissime punctata; antennæ gracillimæ, thorace longiores; prothorax testaceo bimaculatus; petiolus longiusculus; abdomen glabrum, subdepressum, postice latescens, thorace multo brevius; pedes gracillimi, femoribus apice tibiis basi tarsisque testaceis; alæ diaphanæ, piceo venosæ.

Male. Black, very slender. Head and thorax very finely punctured. Head a little broader than the thorax. Antennæ very slender, longer than the thorax; joints long. Prothorax with two testaceous humeral spots. Metathorax attenuated. Petiole rather long. Abdomen rather flat, much shorter than the thorax, gradually increasing in breadth from the base nearly to the tip. Femora at the tips, tibiæ at the base and tarsi testaceous. Wings pellucid; veins piceous; ulna a little more than half the length of

the humerus; cubitus hardly longer than the radius, about one-third of the length of the ulna. Length of the body 1¼ line.

The longer antennæ distinguish it from I. Nepe.

I. ÆQUALIS.—*Fœm.* Nigra, gracilis, subtiliter punctata; antennæ subclavatæ, breves; prothorax fulvo bimaculatus; abdomen glabrum, fusiforme, thoraci æquilongum; pedes nigri, genubus pallide testaceis, tibiis anticis apice tarsisque quatuor posterioribus fulvis; alæ diaphanæ, piceo venosæ.

Female. Black, slender. Head and thorax finely punctured. Head a little broader than the thorax. Antennæ subclavate, about half the length of the thorax; third joint longer than the second, and much longer than the fourth; the latter and the three following joints nearly equal in length; club nearly thrice longer than the seventh. Prothorax with two tawny humeral spots. Abdomen fusiform, as long as the thorax. Knees pale testaceous; four posterior tarsi and tips of the fore tibiæ tawny. Wings pellucid; veins piceous; ulna more than half the length of the humerus; radius much shorter than the cubitus, which is about one-fourth of the length of the ulna. Length of the body 1½ line.

A little stouter than I. angustipennis, and with broader fore wings.

England.

I. TIBIALIS. — *Fœm.* Nigra, gracilis, subtilissime punctata; antennæ clavatæ, breves; prothoracis maculæ dux fulvæ, maximæ; abdomen glabrum, sublanceolatum, subdepressum, thorace paullo longius; pedes nigri, femoribus apice tibiisque basi testaceis, tarsis quatuor posterioribus fulvis; alæ diaphanæ, testaceo pallido venosæ.

Female. Black, slender. Head and thorax very finely punctured. Head very little broader than the thorax. Antennæ clavate, somewhat longer than the breadth of the head; fifth, sixth and seventh joints transverse. Humeral spots of the prothorax tawny, very large, each about one-third of the breadth of the prothorax. Abdomen slightly lanceolate, rather flat above, a little longer than the thorax. Femora towards the tips and tibiæ towards the base testaceous; four hinder tarsi tawny. Wings pellucid; veins pale testaceous; ulna less than half the length of the humerus; cubitus longer than the radius, about half the length of the ulna. Length of the body 1¼ line.

The fore wings are narrower than those of I. Laothoe, and the abdomen is longer.

England.

I. CANALICULATA. *Fœm.*—Nigra, subtiliter punctata; antennæ clavatæ, breviusculæ; prothorax albido bimaculatus; abdomen glabrum, depressum, sublanceolatum, thorace longius; pedes nigri, femoribus apice tibiis basi tarsisque quatuor posterioribus pallide flavis, tibiis tarsisque anticis fulvis; alæ diaphanæ, albido venosæ.

Female. — Black. Head and thorax finely punctured. Head hardly broader than the thorax. Antennæ clavate, much longer than the breadth of the head. Prothorax with two whitish transverse humeral spots. Abdomen sublanceolate, depressed, somewhat longer than the thorax. Femora at the tips, tibiæ at the base and four posterior tarsi pale yellow; fore tibiæ and fore tarsi tawny. Wings pellucid; veins whitish; ulna less than half the length of the humerus; cubitus a little longer than the radius, a little more than half the length of the ulna. Length of the body 1¼ line.

Between I. Laothoe and I. linearis; it differs from the former by the shorter and more clavate antennæ, from the latter by the little less clavate antennæ and by the broader fore wings.

South France. In the collection of the Rev. T. A. Marshall.

E. NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.

NOTES

ON

CHALCIDIÆ.

PART II.—EURYTOMIDÆ AND TORYMIDÆ.

BY

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NOTES ON CHALCIDIÆ.

PART II.

Fig. 1.

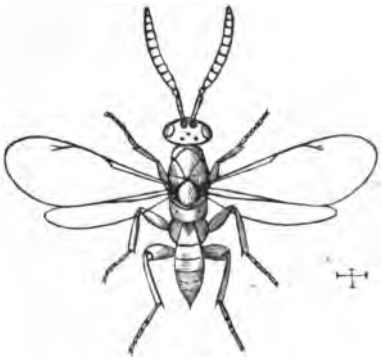

Fig. 2.

The two figures here inserted represent (1) Torymus caliginosus and (2) Podagrion splendidum.

EURYTOMIDÆ.

IN this concluding part of the sketch of the Eurytomidæ the following extract is another instance in which the genus Eurytoma is herbivorous, and not parasitic, on other insects.

In the 'Entomologist,' No. 88, p. 264 (March, 1871), Mr. Ritsema states that the galls found by Mr. Traill, near Aberdeen, on Ammophila arundinacea (Psamma arenaria, *L.*), were made by Eurytoma longipennis, and that they also occur near Landvoort in Noord-Holland, and that the economy of the fly is detailed in the 'Archives Néerlandaises des Sciences exactes,' vol. v. 1870; and is also noticed in the 'Nederlandsch Tydschrift voor Entomologie,' 2nd Ser. vol. vi. 1871.

The Eurytomæ and the Decatomæ are generally supposed to be parasitic; but it has not yet been ascertained whether their larvæ feed on the inhabitants of the galls or on the substance of the galls. Ratzeburg has published in his work, 'Die Ichneumonon,' a very large list of the insects which are the victims of the Hymenopterous parasites, and it will be seen that in many cases one kind is the prey of several parasites, and that one parasite (among others Eurytoma, as is also observed by Dr. Giraud) preys on several kinds. Others seem to be exclusively attached to one victim for the maintenance of their young by means of the insertion of their eggs, and to resort instinctively for that purpose to the same kind of object whence they emerged, and to succeed in finding it. It is not yet known whether a parasite, of which several species are victims, has a propensity to resort for oviposition to the same kind of habitation in which it passed its earlier life, or whether it takes the victim that is most convenient to it at once, or when it has failed to find the species whence it emerged; or, are there hereditary peculiarities in the families of the same species, and does one family live exclusively, generation after generation, in the larvæ of beetles, another in the larvæ of moths, another in Cynips larvæ, and another in Dipterous larvæ?

The species recorded as E. Abrotani in the Brit. Mus. List of Chalcidiæ, p. 8, may be identical with E. tibialis, *Zett. Boh. Kongl. Vet. Ak. Handb.* (1835), 232, and with E. rubicola, *Giraud.*

The species of Eurytoma described by Boheman have been all recorded in the above-mentioned list, with the following exceptions, of which the second and, perhaps, the third are species of Isosoma, —E. maura, E. pilicornis, E. brevicornis, E. pubicornis, E. obscura.

Isosoma flavimana is mentioned inadvertently as a Eurytoma in this list.

Zetterstedt, in his 'Insecta Lapponica,' describes Eurytoma guttula and E. minuta: the first may be identical with Isosoma verticillata; and the second with I. minor.

Eurytoma atra, *Nees*, is probably not one of the Eurytomidæ.

Among the species described by Foerster Eurytoma gracilis, E. scabra, E. pumila, E. petiolata and E. punctulata are Eurytomæ. E. flavipes and E. humeralis belong to Isosoma.

The two following species are described by Ratzeburg, in addition to those before mentioned:—E. microneura, E. brunneiventris.

Some of the European species of Eurytoma may be arranged in the following groups:—

Male. Antennæ setaceous, nodose, verticillate-pilose, as long as the thorax.

Group 1.—plumata, Serratulæ, curta, Abrotani, apicalis, collaris, annulipes, atra, nodularis.

Antennæ longer and more slender than those of the first group. longipennis.

Antennæ shorter and more compact than those of the first group. platyptera.

Antennæ less dilated than those of the three preceding groups, more compact than those of the first group. tumida, rufipes, Scultenna, brevicollis.

Antennæ of the *female*:—

Group 1.—plumata, Serratulæ, curta, annulipes, rufipes, æthiops, nodularis.
Group 2.—tumida, Abrotani.
Group 3.—collaris.
Group 4.—atra.
Group 5.—platyptera.

Variations of the wing-veins:—

Group 1.—Ulna about one-fifth of the length of the humerus; radius longer than the ulna. plumata, Serratulæ, rufipes.

Group 2.—Ulna about one-fourth of the length of the humerus; radius a little shorter than the ulna. Argele, fumipennis, tumida, platyptera, gracilis, brevicollis.

Group 3.—Ulna nearly one-third of the length of the humerus; radius as long as the ulna. longipennis.

Group 4.—Ulna about one-third of the length of the humerus; radius as long as the ulna. atra.

Group 5.—Ulna about one-third of the length of the humerus; radius a little shorter than the ulna. curta, Abrotani, apicalis, collaris, Scultenna, annulipes, Micipsa, æthiops.

With regard to the North-American Eurytomæ, E. Hecale, Abatos, Cretheis, Iphis, Pythes and Teredon agree with E. longipennis in the form of the prothorax. The form of the metathorax in all these species, except the first, is like that of the preceding first group of the European species; in E. Hecale its longitudinal sutures

are all distinct, and each of them is alternate with a row of punctures. The petiole is longer than the metathorax in E. Cretheis and Teredon; but in E. Hecale, Abatos, Iphis and Pythes the metathorax is longer than the petiole.

The six preceding species were found in Florida, and appear to differ from the seven following species described by Dr. Walsh:—

1. E. bicolor. Reared from a fungoid swelling on the oak.
2. E. prunicola. Reared from a gall on Quercus Prunus. *Var.* globulicola. Reared from a gall on Q. globulus.
3. E. auriceps. Reared from oak-galls and from rose-galls. *Var.* seminatrix. Reared from oak-galls.
4. E. punctiventris. Reared from oak-galls.
5. E. abnormicornis.
6. E. Diastrophi. Reared from the above-mentioned fungus and from bramble-galls. E. Bolteri, *Riley*, reared from the gall of Gelechia gallæsolidaginis, is said, by Dr. Walsh, to be a variety of E. Diastrophi, but it may be another species.
7. E. studiosa, *Say*. This species is not exclusive in its selection of a habitation for its offspring, but proceeds indiscriminately to a Cynips gall, to a Tenthredo gall, to a Cecidomyia gall, to an Aphis gall, to a Coccus gall, or to a fungus with the likeness of a gall; or it may consist of families or castes, each of which keeps aloof from the rest, and has been brought up from time immemorial in one kind of gall.

Dr. Walsh was not able to identify E. orbiculata, *Say*.

Five Ceylonese species of Eurytoma have been described;—1. E. contraria, *Wlk.* (albitarsis, *Motsch.*). 2. E. indefensa, *Wlk.* 3. E. maculipes, *Motsch.* 4. E. gracilis, *Motsch.* 5. E. angustula, *Motsch.*

E. Capensis inhabits South Africa.

The British species of Decatoma may be placed in the three following groups according to the variations of length in the ulna:—

Group 1.—Ulna at least one-fifth of the length of the humerus. Nicæa, aspilus.

Group 2.—Ulna about one-sixth of the length of the humerus. biguttata, obscura, immaculata, plana, flavicollis, variegata, minuta, unicolor.

Group 3.—Ulna not more than one-tenth of the length of the humerus. flavicornis, tenuicornis, mesomelas.

D. flavovaria, *Ratz.*, may be the same as D. concinna; and D. flavoscapularis, *Ratz.*, may be identical with D. biguttata.

Dr. Walsh describes the five following American species of Decatoma, four of which inhabit oak-galls and one willow-galls also:—varians, nigriceps, nubilistigma, hyalipennis, simplicistigma. They have the same variation in the "colorational pattern" that is exhibited by the British species. D. pigra, *Motsch.*, a Ceylonese species, is probably not a Decatoma.

It seems that there is no definite line between Eurytoma and Isosoma, but it is advisable to retain the latter genus, I. verticillata being its type, and E. plumata the type of Eurytoma. The genus Tetramesa may be united to Eurytoma.

In passing away from the Eurytomidæ, I wish to recommend them to the attention of the public. They are especially interesting, as being partly exceptions to the rule that all the Chalcidiæ are beneficial insects; and much investigation is required to ascertain whether some of them are wholly herbivorous and the rest wholly carnivorous, or whether the species have a capacity for either means of sustenance. There is a gradual transition from them to the Torymidæ, by means of the genera Decatoma and Megastigmus.

Genus EURYTOMA.

E. EXEMPTA. *Mas.*—Nigra, gracilis, E. gracili longior, subtilissime punctata; antennæ graciles, verticillato-pilosæ, thorace paullo longiores, articulis petiolatis subdilatatis; petiolus longus; abdomen brevi-lanceolatum, valde convexum, vix compressum, thoracis dimidio vix longius; pedes nigri, genubus tarsisque fulvis; alæ diaphanæ, fulvo venosæ.

Male.—Black, slender. Head and thorax finely punctured. Antennæ slender, verticillate-pilose a little longer than the thorax; joints slightly dilated on one side, with rather long petioles. Petiole long. Abdomen very convex, short-lanceolate, hardly more than half the length of the thorax, hardly compressed. Knees and tarsi tawny. Wings pellucid; veins dull tawny; ulna a little more than half the length of the humerus; radius very short; cubitus a little more than half the length of the ulna. Length of the body $1\frac{1}{6}$ line.

The body is longer than that of E. gracilis, which it most resembles.

England.

E. INTERMISSA. *Fœm.*—Nigra, gracillima, subtiliter punctata; antennæ graciles, subclavatæ, thorace multo breviores; petiolus brevis; abdomen lanceolatum, glabrum, nitens, thorace paullo longius; pedes nigri, genubus tarsisque albidis; alæ diaphanæ, albido

venosæ. E. gracili affinis; differt antennis gracilioribus, petiolo longiore, alarum venis pallidioribus.

Female.—Black, very slender. Head and thorax finely punctured. Head a little broader than the thorax. Antennæ slender, subclavate, much shorter than the thorax. Petiole short, distinct. Abdomen lanceolate, smooth, shining, a little longer than the thorax. Legs black; knees and tarsi whitish. Wings pellucid; veins dingy whitish; ulna about one-third of the length of the humerus; radius much shorter than the ulna; cubitus a little shorter than the radius. Length of the body $1\frac{1}{6}$ line.

Most allied to E. gracilis, from which the more slender antennæ, the longer petiole and the paler wing-veins distinguish it.

England.

Genus ISOSOMA.

I. JUNCEA. *Mas.*—Nigra, nitens, gracillima; antennæ graciles, filiformes, verticillato-pilosæ, thoraci æquilongæ, articulo 1o subincrassato; petiolus brevissimus; abdomen convexum, longi-fusiforme, thorace angustius et multo brevius; pedes graciles, tarsis quatuor posterioribus genubusque albido-testaceis, illis apice tarsisque anticis pallide fuscescentibus; alæ angustæ, diaphanæ, testaceo pallido venosæ.

Male.—Black, very slender. Head and thorax shining, extremely finely punctured. Head broader than the thorax. Antennæ slender, filiform, verticillate-pilose, as long as the thorax; scape slightly incrassated; intermediate joints linear. Petiole very short. Abdomen convex, smooth, elongate-fusiform, narrower and much shorter than the thorax. Legs slender; knees, four posterior tarsi and tips of tibiæ whitish testaceous; fore tarsi and tips of four posterior tarsi pale brownish. Wings narrow, pellucid; veins pale testaceous; ulna about one-third of the length of the humerus; radius about one-third of the length of the ulna, a little longer than the cubitus. Length of the body 1 line.

More slender than I. minor and than I. linearis. Antennæ stouter than those of I. brevis.

I have not been able to see any humeral spots on the prothorax of the single specimen of this species.

England.

I. ROBUSTA. *Mas.*—Nigra; antennæ sat validæ, verticillato-pilosæ, thoraci æquilongæ; prothoracis maculæ laterales piceæ, parvæ; petiolus brevissimus; abdomen ellipticum, convexum, thorace multo

brevius; pedes sat validi, genubus tarsisque fulvis; alæ anticæ vix fuscescentes, fusco venosæ.

Male.—Black. Head and thorax very finely punctured. Head a little broader than the thorax. Antennæ rather stout, verticillate-pilose, as long as the thorax; joints linear. Humeral spots piceous, small. Petiole very short. Abdomen elliptical, convex, smooth, very much shorter than the thorax. Legs rather stout; knees and tarsi tawny. Fore wings hardly brownish; veins brown; ulna about half the length of the humerus; cubitus about one-fourth of the length of the ulna, longer than the radius. Length of the body 1 line.

The stouter antennæ, and the shorter and broader abdomen distinguish this species from I. brevis.

England.

I. LATIVENTRIS. *Fœm.*—Nigra, gracilis, subtilissime punctata; antennæ subclavatæ, thorace multo breviores; prothoracis maculæ laterales albidæ, maximæ; petiolus brevissimus; abdomen ellipticum, glabrum, nitens, subdepressum, thorace paullo latius multo brevius; pedes nigri, tibiis piceis, femoribus tibiisque apice tibiis basi tarsisque testaceis; alæ anticæ pallidissime fuscescentes, testaceo venosæ, basi diaphanæ.

Female.—Black, slender. Head and thorax very finely punctured. Head a little broader than the thorax. Antennæ subclavate, much shorter than the thorax; second joint livid at the tip. Humeral spots dingy whitish, transverse, each occupying about one-third of the breadth of the prothorax. Petiole very short. Abdomen elliptical, smooth, shining, rather flat, a little broader and much shorter than the thorax; first segment occupying most of the dorsum. Oviduct testaceous. Legs black; tibiæ piceous; tips of femora and of tibiæ, tibiæ at the basi and tarsi testaceous. Fore wings very pale brownish, pellucid towards the base; veins testaceous; ulna about one-fourth of the length of the humerus; radius and cubitus much shorter than the ulna. Length of the body 1¼ line.

Madeira.

I. ÆQUALIS. *Fœm.*—Nigra, subtilissime punctata; antennæ graciles, subclavatæ, thorace valde breviores, clava fusiformi; prothoracis maculæ laterales testaceæ, parvæ; petiolus brevissimus; abdomen fusiforme, convexum, glabrum, nitens, thorace multo brevius; pedes nigri, femoribus tibiisque apice tibiis basi tarsisque testaceis; alæ anticæ pallidissime fuscescentes, testaceo venosæ, basi diaphanæ. I. lineari affinis; differt abdomine breviore minus acuminato.

Female.—Black. Head and thorax very finely punctured. Head

a little broader than the thorax. Antennæ slender, subclavate, very much shorter than the thorax; club fusiform, thrice the length of the preceding joint. Humeral spots testaceous, small. Petiole extremely short. Abdomen fusiform, convex, smooth, shining, much shorter than the thorax. Legs black; tips of femora and of tibiæ, tibiæ at the base and tarsi testaceous. Fore wings very pale brownish, pellucid towards the base; veins testaceous; ulna about one-fourth of the length of the humerus; radius and cubitus much shorter than the ulna. Length of the body 1¼ line.

The abdomen is shorter and less acuminated hindward than that of I. linearis. The longer and broader fore wings distinguish it from I. angustata.

Madeira.

I. ANTICA. *Fœm.*—Nigra, subtilissime punctata; antennæ subclavatæ, thorace multo breviores, clava lineari apice conica; prothoracis maculæ laterales testaceæ, minimæ; petiolus brevissimus; abdomen fusiforme, glabrum, nitens, supra planum, thorace paullo brevius; pedes nigri, tibiis quatuor posterioribus piceis, femoribus tibiisque apice tibiis anticis tarsisque flavescentibus, tarsis apice piceis, alis anticis disco subtestaceo venis flavescentibus. I. lineari affinis; differt antennis longioribus crassioribus, thorace breviore, abdomine longiore.

Female.—Black. Head and thorax very finely punctured. Head a little broader than the thorax. Antennæ subclavate, very much shorter than the thorax; club linear, conical towards the tip, about thrice the length of the preceding joint. Humeral spots testaceous, very small. Petiole extremely short. Abdomen fusiform, smooth, shining, flat above, a little shorter than the thorax. Legs black; four posterior tibiæ piceous; tips of femora and of tibiæ, tarsi and fore tibiæ yellowish; tarsi with piceous tips. Fore wings with a slight testaceous tinge in the disk adjoining the ulna; veins yellowish; ulna about one-fourth of the length of the humerus; radius and cubitus much shorter than the ulna. Length of the body 1¼ line.

It much resembles I. linearis; the antennæ are longer and stouter; thorax is shorter and the abdomen is longer.

Madeira.

I. SUBFUMATA. *Mas.*—Nigra, gracillima, subtilissime punctata; antennæ verticillato-pilosæ, thorace longiores, articulis linearibus non petiolatis; thorax postice attenuatus; prothoracis maculæ laterales flavæ, sat magnæ; petiolus brevissimus; abdomen sublineare, glabrum, nitens, fere planum, thoracis dimidio paullo longius; pedes nigri, graciles, tibiis basi apiceque femoribus anticis apice

tarsisque pallide flavis; alæ anticæ vix fuscescentes, venis pallide fuscescentibus.

Male.—Black, very slender. Head and thorax very finely punctured, somewhat shining. Head rather broader than the thorax. Antennæ verticillatè-pilose, longer than the thorax; intermediate joints long, nearly linear, not petiolated. Thorax long, attenuated hindward. Humeral spots pale yellow, transverse, each occupying a little more than one-fourth of the breadth of the prothorax. Petiole extremely short. Abdomen smooth, shining, nearly linear, rather flat above, a little more than half the length of the thorax. Legs black, long, slender, tibiæ at the base and at the tips, fore femora at the tips and tarsi pale yellow. Fore wings very slightly clouded with pale brownish; veins pale brownish; ulna about one-fourth of the length of the humerus; radius and cubitus much shorter than the ulna. Length of the body $1\frac{1}{6}$—$1\frac{1}{4}$ line.

It much resembles I. Nepe; the antennæ are a little longer, the hind part of the thorax is more elongated and the wing-veins are paler. The darker fore wings, and more especially the darker wing-veins, distinguish it from I. minor and from I. brevis. It is more slender than I. cornuta, and has shorter antennæ than I. longicornis.

Madeira.

Fam. TORYMIDÆ.

The occupation of this family, like that of the Eurytomidæ, is, with a few exceptions, in galls, and they are especially adapted to destroy their predecessors in the galls, for nearly all the species are provided with a long projecting oviduct, which in some species is of sufficient length to reach the central inhabitant of the largest gall. The general colour of the family is golden green, of which hue there is no trace in the Eurytomidæ, but a gradation between the two families appears in Megastigmus: the yellow or luteous body of the latter genus is in M. dorsalis partly overspread with golden green, borrowed from the species of Callimome, with which it is associated in oak-apples. The European genera have been distinguished according to the following synopsis:—

A. Hind femora with spines, and also serrated or notched.
 a. Hind tibiæ much curved. - - PODAGRION.
 b. Hind tibiæ not curved. - - - TORYMUS.
B. Hind femora with spines.
 a. Hind coxæ with spines. - - - MONODONTOMERUS.
 b. Hind coxæ without spines. - - DIOMORUS.
 c. Hind femora serrated. - - - OLIGOSTHENUS.

C. Hind femora without spines and not serrated.
a. Radius of the fore wings as long as, or longer than, the ulna; cubitus with a thick knob. - - - - MEGASTIGMUS.
b. Radius much shorter than the ulna; cubitus with no thick knob.
* Scutellum near the tip with a strongly impressed transverse line. - - SYNTOMASPIS.
** Scutellum with no strongly impressed transverse line.
† Sutures of the parapsides coming close to the scutellum. - - - LOCHITES.
†† Sutures of the parapsides at some distance from the scutellum. - - - CALLIMOME.

Podagrion is found in most parts of the world, and is represented by a few species, which feed on the eggs of the Mantis tribe.

Palmon pachymerus is a synonym of Podagrion splendens; the latter genus and Bachyrischion, *Costa*, are identical.

Torymus (Cryptopristus, *Foerster*) includes the following species:—caliginosus, calcaratus, laticornis, macromerus, intermedius, fulvocinctus and Syrphi. T. calcaratus is associated with Megastigmus giganteus in the single-chambered Mediterranean oak-gall.

Monodontomerus is represented by M. dentipes, Anthophoræ, intermedius, militaris and vacillans, and is a parasite of bees; it also includes M. Phormio, a South-American species.

Diomorus has two species, nobilis and Kollari; it can hardly include Torymus tarsatus, *Nees*, and T. dubius, *Nees*, which have a depressed abdomen.

Oligosthenus is founded on O. stigma, O. ater and O. tibialis. O. stigma is exclusively attached to the large pincushion-rose-gall, where, in conjunction with Callimome bedeguaris and a species of Porizon, it limits the increase of Rhodites Rosæ.

L. Papaveris is the only species known of Lochites.

Syntomaspis is closely allied to Callimome, and is represented by chrysis, eurynotus, lazulinus, macrurus.

Megastigmus contains a few European species, a few in Australia of small size, and two rather large Californian species, M. Pinus and M. albifrons.

Torymus erythrothorax, *Nees*, is perhaps a synonym of M. collaris, *Boh.*, and of M. strobilobius, *Ratz.* The oviduct of M. Bohemanni *Ratz.*, reaches to the scutellum, and that of M. brevicaudis, *Ratz.*, is hardly as long as the abdomen.

The species of Callimome are very numerous, and appear to be exclusively in attendance on galls. Their colour is golden green,

replaced in a few species by blue or by purple, or by reddish cupreous. When a reddish or yellowish hue appears it is only on the abdomen, where it forms a band or occupies the basal part.

C. nigricornis perhaps is brought up exclusively in oak-apples, and its long oviduct is exactly adapted to the probing of these from the outside to the middle, and when it (the next generation) has emerged thence in its perfect form, and is about to seek a suitable place for its eggs it resorts to a more recent oak-apple by instinct. When the oak-apple has attained its full size the grub in the middle of it is only accessible to C. nigricornis, but when the oak-apple is of small size this grub is liable to the attacks of other species of Callimome. Some species of this genus dwell both in oak-apples and in other oak-galls, and having comparatively short oviducts they limit their egg-laying to the more or less superficial inhabitants of the oak-apples. These have the choice of two means of bringing up the ensuing generation, and when they leave the old oak-apples and cannot find convenient fresh oak-apples they may resort to the oak-currants, and when they take wing from the oak-currants and can find none of that year's growth they may fly to the oak-apples. It will be said that when both ways of subsistence are equally attainable, the flies from oak-apples will select oak-apples, and those from oak-currants will prefer oak-currants by "the law of inheritance."

The European species of Callimome, with a few exceptions, are included in the following Synopsis:—

A. Oviduct more than twice the length of the body.
 a. Abdomen not blue-æneous. - - nigricornis, *Fabr.*
 b. Abdomen blue-æneous. - - cyaneus, *Fons.*
B. Oviduct a little less than twice the length of the body. - - - - saphirinus, *Boh.*
 crinicaudis, *Ratz.* chalybæus, *Ratz.*
C. Oviduct longer by half than the body.
 a. Abdomen pale at the base. - - cynipedis, *Linn.*
 b. Abdomen not pale at the base.
 * Body blue. - - - - azureus, *Boh.*
 ** Body green. - - - - quercinus, *Boh.*
 *** Body cupreous. - - - speciosus, *Boh.*
D. Oviduct longer than the body. - - Devoniensis, *Parfitt.*
 annulatus, *Spin.* macrocentrus, *Ratz.*
E. Oviduct a little longer than the body. - elegans, *Boh.*
 Forsteri, *Ratz.* Lasiopteræ, *Gir.*
F. Oviduct hardly longer than the body. - Druparum, *Boh.*
G. Oviduct as long as the body.
 a. Abdomen pale at the base.

* Legs yellow. - - - - cingulatus, *Nees.*
Cyniphidum, *Ratz.*
** Legs ferruginous. - - - æneus, *Nees.*
rubripes, *Ratz.*
b. Abdomen not pale at the base.
* Fore wings clouded. - - - fuliginosus, *Spin.*
** Fore wings not clouded.
† Body blue. - - - - sapphyrinus, *Fonsc.*
†† Body not blue.
‡ Tarsi black. - - - - nigritarsus, *Wlk.*
‡‡ Tarsi yellow.
§ Body green. - - - - pallidicornis, *Boh.*
§§ Body blue. - - - - contubernalis, *Boh.*
§§§ Body cupreous. - - - fuscipes, *Boh.*
H. Oviduct hardly shorter than the body.
a. Abdomen pale at the base. - - abdominalis, *Boh.*
b. Abdomen not pale at the base.
* Wings broad. - - - - macropterus, *Wlk.*
** Wings not broad.
† Wings pellucid.
‡ Veins brown. - - - - terminalis, *Wlk.*
‡‡ Veins pale - . - - - abbreviatus, *Boh.*
†† Wings white. - - - - leucopterus, *Wlk.*
††† Wings nearly pellucid. - - - amœnus, *Boh.*
†††† Wings cinereous. - - - divisus, *Wlk.*
I. Oviduct a little shorter than the body.
a. Abdomen pale at the base. - - nobilis, *Boh.*
b. Abdomen not pale at the base.
* Thorax violet-blue. - - - aurulentus, *Nees.*
** Thorax not violet-blue.
† Wings brownish.
‡ Legs pale red. - - - - Bedeguaris, *Linn.*
‡‡ Legs yellow. - - - - meridionalis, *Wlk.*
†† Wings pellucid.
‡ Wings short. - - - - micropterus, *Wlk.*
‡‡ Wings long. - - - - Euphorbiæ, *De Lap.*
pallitarsis, *Foerst.*
J. Oviduct more than half the length of the body.
a. Fore wings not clouded.
* Size large. - - - - formosus, *Wlk.*
** Size small. - - - - chlorocopes, *Boh.*
b. Fore wings spotted. - - - Kaltenbachi, *Foerst.*
K. Oviduct longer by half than the abdomen.
a. Abdomen not pale at the base.
* Wings pellucid.

† Body green. - - - - euchlorus, *Boh.*
appropinquens, *Ratz.*
†† Body blue. - - - - cyaneus, *Fabr.*
** Wings nearly hyaline. - - - fastuosus, *Boh.*
*** Wings brownish - - - parellinus, *Boh.*
b. Abdomen pale at the base.
* Wings brown. - - - - chrysocephalus, *Boh.*
** Wings pellucid. - - - Angelicæ, *Wlk.*
L. Oviduct as long as the abdomen and thorax, excepting the prothorax. - splendidus, *Foerst.*
chlorinus, *Foerst.*
M. Oviduct as long as three-eighths of the body. - - - - Nordlingeri, *Ratz.*
N. Oviduct as long as two-fifths of the body. cultriventris, *Ratz.*
pumilus, *Ratz.*
O. Oviduct rather longer the abdomen. - strenuus, *Wlk.*
P. Oviduct a little longer than the abdomen.
a. Body much contracted. - - - contractus, *Ratz.*
robustus, *Ratz.*
b. Body not much contracted.
* Body blue. - - - - amethystinus, *Boh.*
** Body green.
† Antennæ slender.
‡ Fore wings yellowish. - - - Hederæ, *Wlk.*
‡‡ Wings pellucid. - - - leptocerus, *Wlk.*
†† Antennæ stout.
‡ Antennæ black.
§ Wings nearly pellucid. - - flavipes, *Wlk.*
§§ Wings pellucid.
+ Body stout.
o Fore wings with a small stigma. - autumnalis, *Wlk.*
oo Fore wings with a very small stigma. - microstigma, *Wlk.*
++ Body slender. - - - - Galii, *Boh.*
‡‡ Antennæ brown. - - - exilis, *Wlk.*
††† Antennæ ——— ? - - - propinquus, *Foerst.*
viridis, *Foerst.* dubius, *Ratz.*
Q. Oviduct as long as the abdomen.
a. Abdomen pale at the base. - - quadricolor, *Wlk.*
b. Abdomen not pale at the base.
* Antennæ black.
† Fore wings spotted. - - - spilopterus, *Boh.*
†† Fore wings not spotted.
‡ Wings pellucid.
§ Legs wholly yellow. - - - auratus, *Enc. Méth.*
§§ Legs partly dark.

+ Legs reddish. - - - - confinis, *Wlk.*
++ Legs yellow.
o Abdomen green.
+ Antennæ clavate. - - - curtus, *Wlk.*
inconspectus, *Wlk.*
++ Antennæ subclavate. - - - mutabilis, *Wlk.*
bicolor, *Wlk.* minutus, *Wlk.*
oo Abdomen purple. - - - purpurascens, *Fabr.*
‡‡ Wings brownish.
§ Body slender. - - - basalis, *Wlk.*
§§ Body broad. - - - - latus, *Wlk.*
** Antennæ brown. - - - fuscicornis, *Wlk.*
R. Oviduct hardly as long as the abdomen. cupratus, *Boh.*
S. Oviduct shorter than the abdomen.
a. Wings pellucid.
* Body narrow. - - - - chlorinus, *Wlk.*
Resinanæ, *Rat.*
** Body rather broad. - - - Capreæ, *De Lap.*
b. Wings brownish.
* Legs tawny. - - - - viridiæneus, *Wlk.*
** Legs green. - - - - Arvernicus, *Wlk.*
T. Oviduct less than half the length of the abdomen. - - - - brachyurus, *Boh.*
V. Oviduct hardly extending beyond the abdomen.
a. Wings brownish.
* Legs straw-colour. - - - nitens, *Wlk.*
** Legs pale red. - - - - brevicauda, *Wlk.*
b. Wings pellucid. - - - abdominalis, *Wlk.*

Male.

A. Abdomen pale at the base.
a. Fore wings spotted. - - - regalis, *Wlk.*
b. Fore wings not spotted. - - pretiosus, *Wlk.*
B. Abdomen not pale at the base.
a. Antennæ brown, black at the base. - microcerus, *Wlk.*
b. Antennæ black.
* Body not black.
† Wings pellucid, or nearly so. - moestus, *Wlk.* straminei-tarsus, *Wlk.* versicolor, *Wlk.* modestus, *Foerst.* associatus, *Foerst.* distinctus, *Foerst.* congener, *Foerst.*
†† Wings yellowish. - - - rufipes, *Foerst.*
††† Wings brownish. - - - apicalis, *Wlk.*
antennatus, *Wlk.* purpurascens, *Boh.*
†††† Wings brown. - - - - fuscipennis, *Wlk.*
** Body black. - - - - ater, *Wlk.*

The species of Callimome described by Boheman are all recorded in the list of Chalcidiæ for the British Museum, with the following exceptions:—C. azureus, speciosus, contubernalis, fuscipes, abdominalis, chlorocopes, cyaneus, amethystinus, purpurascens, cupratus, brachycerus. These are inserted in the preceding Synopsis of the species.

The abdomen of C. fuliginosus, *Spin.*, and of C. annulatus, *Spin.*, is short and depressed, and they differ thereby from the rest of the European species of this family, and perhaps do not belong to it. C. longicauda and C. crinicaudis, *Ratz.*, are perhaps identical with C. nigricornis.

Torymus fasciatus, *Nees* (Cynips fasciata, *Fons. Ann. Sci. Nat.* 1832, 288), appears to be a species of Decatoma.

Callimome viridissimus, *Zett.*, includes four species of that genus. C. caudatus, *Nees*, is perhaps C. saphirinus. C. difficilis, *Nees*, may be C. flavipes. C. globiceps, *Nees* (Ichn. globiceps, *Ratz.*), is perhaps not a Callimome. C. nitidulus, *Nees*, may be a small variety of C. nobilis. C. quercicola, *Nees*, is the same as C. cingulatus. C. minor, *Ratz.*, may be a Monodontomerus. C. Dresdensis, metallicus and anephelus may be Diomori. C. cultriventris, Nordlingeri and confluens, *Ratz.*, have been reared from the conical galls formed on beech-leaves by Cecidomyia Fagi: these galls have been lately observed in England. I have seen abundance of them in Belgium, in Switzerland, and in some parts of France, and have reared one species of Callimome from them. In the description of C. obscuripes, *Foerst.*, the length of the oviduct is not stated. C. igneiventris, *Costa*, is an inhabitant of South Italy.

The North-American species of Callimome are as yet little known; only seven have been described, two of which were found at St. Martin's Falls, in Hudson's Bay, and two in Florida: they much resemble the European species. C. pavidus and C. ocreatus inhabit Indiana, and are described by Say. The South-American and Australian examples of Callimome are smaller than most of those in Europe, and the species described as C. sulcus is probably a Megastigmus. C. Ceylonica, *Motsch.*, is the only Asiatic species yet described.

The exotic genera of Torymidæ are not numerous. I have not seen Pelecinella, *Westw.*, nor Pachytomus, *Westw.*, which are said to belong to this family. Pachytomus may be one of the Agaonidæ. Ecdamua is remarkable on account of its excessively long oviduct, and the indications of the genus Metamorpha to a remote affinity with Leucospis have been before mentioned.

Platyscapa, *Motsch.*, and Platyneura, *Motsch.*, do not belong to the Torymidæ.

Genus CALLIMOME.

C. STRENUUS. *Fœm.*—Aureo-viridis, cupreo varius; antennæ nigræ, robustæ, subclavatæ, thorace paullo breviores, scapo luteo; abdomen basi cupreum, thorace paullo longius; oviductus abdomine longior; pedes flavi, femoribus tibiisque posticis nigricantibus basi apiceque flavis, tarsis pallidissime flavis; alæ anticæ disco pallidissime fuscescentes. C. macroptero affinis; alæ anticæ paullo angustiores.

Female.—Golden green. Head and thorax finely squamous, partly cupreous. Head a little broader than the thorax. Antennæ black, stout, subclavate, a little shorter than the thorax; first joint luteous. Abdomen cupreous at the base, a little longer than the thorax. Sheath of the oviduct rather longer than the abdomen. Legs yellow; hind femora and hind tibiæ blackish, except at the base and at the tips; tarsi very pale yellow. Wings pellucid; veins tawny; ulna much shorter than the humerus; radius about one-fourth of the length of the ulna; cubitus very short. Length of the body 1½ line.

Near C. macropterus: the fore wings are a little narrower, and have a faint brownish tinge in the disk.

England. In Dr. Chapman's collection.

C. DIVISUS. *Fœm.*—Cyaneo-viridis; frons aureo-viridis; antennæ nigræ, subclavatæ, thorace paullo breviores; scapo fulvo; abdomen cupreum, basi cyaneo-viride; oviductus corpore perpaullo brevior; pedes lutei, tarsis quatuor posterioribus pallide flavis; alæ anticæ cinereæ, fulvo venosæ. C. elegati affinis; oviductus brevior.

Female.—Very bright bluish green, slender. Head and thorax finely squamous. Head as broad as the thorax; front bright golden green. Antennæ black, subclavate; a little shorter than the thorax; first joint tawny. Prothorax short. Sutures of the parapsides strongly marked; scutellum elliptical, with a few short whitish bristles. Abdomen smooth cupreous, brilliant, bright bluish green at the base, with a few short bristles towards the tip, as long as the thorax. Sheath of the oviduct nearly as long as the body. Legs luteous; four posterior tarsi pale yellow. Wings cinereous; veins tawny; ulna about half the length of the humerus; radius much shorter than the ulna; cubitus and stigma black, the former extremely short. Length of the body 1⅘ line.

Nearly allied to C. elegans, but the oviduct is shorter.

Torla, Spain. In the collection of the Rev. T. A. Marshall.

Genus MEGASTIGMUS.

M. PISTACIÆ, *Haliday MS.* *Fœm.*—Pallide testaceus; frons albida; antennæ fulvæ, fere filiformes, thorace multo breviores, scapo pallide testaceo; thorax fulvo univittatus, abdomen subfusiforme, thorace brevius, segmentis fuscescente fasciatis; oviductus niger, abdomini æquilongus; pedes albidi; alæ diaphanæ, testaceo venosæ, stigmate nigro.

Female.—Pale testaceous. Head a little broader than the thorax; front whitish. Eyes red. Antennæ tawny, nearly filiform, much shorter than the thorax; first pale testaceous; club lanceolate. Thorax with a tawny stripe, in structure like that of M. dorsalis. Petiole extremely short. Abdomen subfusiform, shorter than the thorax, with a brownish band on each segment. Sheath of the oviduct black, slightly curved, as long as the abdomen. Legs whitish. Wings pellucid; veins testaceous; ulna about one-fourth of the length of the humerus; radius and cubitus very short; stigma black. Length of the body 1⅔ line.

On Pistacia lentiscus and on P. terebinthus in S. France and in Tuscany.

Genus ECDAMUA.

E. INDICA. *Fœm.*—Aureo-viridis, gracillima; caput thorace latius; antennæ nigræ; petiolus pallide flavus, gracillimus, metathoraci æquilongus; abdomen thorace multo brevius, basi pallide flavus; oviductus corpore plus duplo longior; pedes flavi; alæ diaphanæ, testaceo pallido venosæ.

Female.—Bright golden green, very slender. Head and thorax very finely squamous. Head large, broader than the thorax. Eyes piceous. Antennæ black. Thorax long. Prothorax elongate-conical, much developed. Scutum long; sutures of the parapside strongly marked. Metathorax slanting, tapering hindward. Petiole pale yellow, very slender, as long as the metathorax. Abdomen smooth, much compressed, much shorter than the thorax. Sheath of the oviduct black, very slender, more than twice the length of the body. Legs yellow, slender. Wings pellucid; veins pale testaceous. Length of the body 2¼ lines.

The pale base of the abdomen and the nearly entirely pale legs distinguish it from E. macrotelus.

Bombay. In the collection of Dr. Leith.

Genus ODOPOIA, n.

Fœm.—Corpus robustum, breve, convexum. Caput et thorax æquilata, subtilissime punctata. Antennæ robustæ, clavatæ, thorace paullo breviores. Prothorax transversus, subquadratus. Mesothorax brevis; parapsidum suturæ vix determinatæ. Metathorax brevis, abrupte declivis. Petiolus gracilis, metathoraci æquilongus. Abdomen glabrum, brevi-ellipticum, subcompressum, valde convexum, thorace brevius. Oviductus abdomine paullo longior. Pedes breviusculi, sat robusti.

Female.—Body stout, short, convex. Head and thorax very finely punctured. Head as broad as the thorax. Antennæ stout, clavate, a little shorter than the thorax. Prothorax subquadrate, well developed, a little narrower than the mesothorax. Mesothorax short; sutures of the parapsides indistinct. Metathorax short, abruptly slanting. Petiole slender, as long as the metathorax. Abdomen smooth, short-elliptical, much arched, slightly compressed, shorter than the thorax. Sheath of the oviduct a little longer than the abdomen exclusive of the petiole. Legs rather short and stout. Wings moderately long and broad.

This genus shows a way to the Eurytomidæ on the one hand, and on the other hand to the Torymidæ, as it partakes of the characters of both families: it differs very widely from Megastigmus.

O. ATRA. *Fœm.*—Atra; pedes nigri, tibiis anticis genubus tarsisque fulvis, femoribus anticis piceis apice fulvis, alis anticis fusco unifasciatis.

Female.—Deep black. Eyes red. Knees, tarsi and fore tibiæ tawny; fore femora piceous, their tips tawny. Wings pellucid. Fore wings with a brown middle band; veins blackish. Length of the body 1 line.

Ceylon.

E. NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.

NOTES

ON

CHALCIDIÆ.

PART III.—TORYMIDÆ AND CHALCIDIDÆ.

BY

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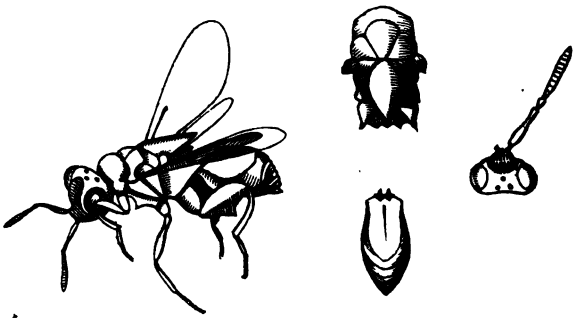
NOTES ON CHALCIDIÆ.

Part III.



The above figure represents Notaspis formiciformis, and, like the preceding and the proposed succeeding figures in these notes, it is from a drawing of the late A. H. Haliday; and I design these illustrations as a remembrance of friendship and correspondence with him for upwards of forty years.

TORYMIDÆ.

The species described in these notes are in the British Museum, with the exception of those mentioned as being in other collections.

Genus TORYMOIDES, n.

Fœm.—Corpus gracile. Caput thorace latius. Antennæ subclavatæ, thorace vix breviores; clava lanceolata. Prothorax brevis. Parapsidum suturæ bene determinatæ. Metathorax brevis, fortiter

punctatus, abrupte declivis. Abdomen sessile, concavum, subcompressum, thoraci æquilongum. Oviductus abdomine vix brevior. Pedes graciles. Alæ amplæ.

Female.—Body slender. Head and thorax convex, very finely squamous. Head rather broader than the thorax. Antennæ subclavate, nearly as long as the thorax; club lanceolate. Prothorax short. Sutures of the parapsides distinct. Metathorax short, largely punctured, abruptly slanting. Abdomen quite sessile, smooth, shining, slightly compressed, concave above, as long as the thorax. Sheaths of the oviduct nearly as long as the abdomen. Legs slender. Wings ample; ulna as long as the humerus; radius short; cubitus very short; stigma small.

The structure of the abdomen distinguishes this genus from Callimome, to which it is most nearly allied.

T. AMABILIS. *Fœm.*—Cyaneo-viridis; antennæ nigræ; abdomen luteum; oviductus niger; pedes pallide flavi, femoribus fulvis; alæ diaphanæ, fulvo venosæ.

Female.—Bright bluish green. Eyes red. Antennæ black. Abdomen luteous. Sheaths of the oviduct black. Legs pale yellow; femora tawny. Wings pellucid; tegulæ pale yellow; veins tawny. Length of the body $\frac{4}{5}$ line.

Ceylon.

Spinola's term Chalcidiæ for this tribe has the right of priority, and therefore should be preferred to that of Pteromalini and to the more recent names.

Genus BLEPHONIRA.

Holmgren, Eug. Resa, 438.

Allied to Podagrion.

B. FULVIPES, *Holmg. Eug. Resa*, 438, pl. 8, f. 6.

China.

Genus CALLIMOME.

C. ALBIPES, *Giraud, Ann. Soc. Ent. Fr. 4me Ser.* ix. 482.

The oviduct of this species is stated to be as long as the head and the abdomen. It inhabits Algeria, is parasitic on lepidopterous galls of Limoniastrum Guyonianum, and connects the genera Syntomaspis and Callimome.

CHALCIDIDÆ.

The concluding notice of the family of Chalcididæ may be brief, as the European species are comparatively few and scarce and have not a prominent part in the control of other manifestations of the insect-race. It is probable that the number of those ascertained to inhabit other regions will be largely increased, but as yet there are many instances in which only one sex of a species is known. With the exception of the following family they excel all the other Chalcidiæ, and almost all of them have no trace of the metallic hue which is so prevalent in the tribe. The list of the genera commences with the extreme limits of the family or those which deviate most widely from the common and peculiar characters of the family. It is doubtful whether the following genus should be considered as of the Chalcididæ.

Genus HYBOTHORAX.

Ratzeburg Ichneumonen, &c., i. 209.

Ratzeburg says that it has affinities with Chalcis, Perilampus, Eurytoma and Bothriothorax. The only known species, H. Graffii, has been reared from the larvæ of Myrmeleon.

Genus NOTASPIS, *Wlk.*

N. FORMICIFORMIS, *Wlk.*

Isle St. Vincent.

This genus differs most widely from the family likeness of the Chalcididæ, both in its structure and in its metallic purple colour.

Genus CHALCITELLA, *Westw.*

C. EVANIOIDES, *Westw.*

Unknown to me.

Genus DIRHINUS, *Dalm.*

D. hesperidum, *Rossi.*—Europe. imperialis, *Giraud.*—Europe. excavatus, *Dalm.*—Egypt and West Africa. Mauritianus, *Westw.*—Mauritius. Himalayanus, *Westw.*—Himalaya. Anthracia, *Wlk.*—Philippine Isles.

Near allied to Halticella.

Genus HALTICELLA.

With this genus I have combined Hockeria, *De Lap.*, Phasgonophora, *Westw.*, Euchalcis, *Leon Dufour* (a synonym of the typical Halticellæ), Allocera, *Sichel*, and Trigonura, *Sich.* The species are

numerous and there are many which agree with Dr. Sichel's definition of Phasgonophora. It is probable that in process of time the species of this family will be partitioned among an excessive number of new genera. There appear to be two principal groups of the typical forms of Chalcididæ, the one represented by Halticella and Dirhinus, the other by Smicra, Chalcis and Epitranus. Phasgonophora and Halticella agree in general structure, and I believe that the low insertion of the antennæ of the latter is not an important character, and the late Dr. Sichel describes Phasgonophora (Subg. Allocera) bicolor as having the antennæ seated near the mouth. Numerous forms of structure occur in the abdominal segments of the female Chalcididæ, but these are merely specific characters, and differences in only one sex are not sufficient for the establishment of genera.

Allusion has been already made to Dr. Sichel's essay on Phasgonophora; his arrangement is as follows :—

Gen. PHASGONOPHORA.

Phasgonophoræ Chalcidiformes.

Subgen. PHASGONOPHORA.

1. rufiventris, *Sich.* 2. thoracica, *Sich.* 3. conigastra, *Perty.* 4. Condalus, *Wlk.* 5. sulcata, *Westw.* 6. rubens, *Klug.* 7. decorata, *Klug.* 8. pyramidea, *Fabr.* 9. caudata, *Guér.* 10. conica, *Fabr.*

Subgen. TRIGONURA.

crassicornis, *Sich.* Mexico.

Phasgonophoræ Halticellæformes.

Subgen. ALLOCERA.

bicolor, *Sich.*

Phasgonophoræ Smicriformes.

variegata, *Sich.*

Gen. CONURA, *Spinola.*

Conuræ Chalcidiformes.

flavicans, *Spin.* scutellaris, *Sich.* bicolor, *Brullé.* dimidiata, *Sich.*

Conuræ Smicriformes.

punctata, *Fabr.* annulipes, *Spin.*

He suggests the name Phas. Gallica for P. conica in case it proves not to be the Chalcis conica of Fabricius.

decorata, pyramidea and caudata belong to the genus Chalcis; variegata is a Smicra, to which genus the Conuræ Chalcidiformes and the Conuræ Smicriformes may be added.

Europe.

pusilla, *Fabr.* bispinosa, *Spin.* bifasciata, *De Lap.* Dargelasii, *Spin.* clavipes, *Rossi.* rufitarsis, *Ill.* nigripes, *Fonsc.* rufipes, *Oliv.* unicolor, *Wlk.* immaculata, *Rossi.* tenuicornis, *Fonsc.* denticornis, *Fonsc.* vicina, *Fonsc.* nebulosa, *Fonsc.* hetera, *De Lap.* Miegii, *L. Duf.* vetusta, *L. Duf.* hematomera, *L. Duf.* tuberculata, *Foerst.* sexdentata, *Foerst.* subarmata, *Foerst.* tarsalis, *Foerst.* pachycera, *Foerst.* conica, *Fabr.* fumipennis, *Wlk.* cincticornis, *Wlk.*

Some few of the names here indicated as species may be merely synonyms.

North America.

Onatas, *Wlk.* Xanticles, *Wlk.* perpulchra, *Walsh.*

Mexico.

rufiventris, *Sichel.* thoracica, *Sich.* crassicauda, *Sich.*

Brazil.

conigastra, *Perty.* Condalus, *Wlk.* Hydara, *Wlk.* erythrotelus, *Wlk.* dorsalis, *Wlk.* declarator, *Wlk.* basalis, *Wlk.* variegata, *Sich.* dubitator, *Wlk.* remotor, *Wlk.*

North Africa.

bicolor, *Sich.* albomaculata, *Lucas.* moderator, *Wlk.* rubens, *Klug.* insolita, *Wlk.*

insolita is inadvertently described as a species of Chalcis in the list of Egyptian and Arabian Hymenoptera collected by J. K. Lord, Esq. H. albomaculata is described by Lucas under the generic name of Thorymus.

West Africa.

simplex, *Wlk.* figurator, *Wlk.* nigricola, *Wlk.*

South Africa.

liberator, *Wlk.* minator, *Wlk.* versator, *Wlk.*

Isle of France.

Mitys, *Wlk.*

West Asia.

bidens, *Foerst.*

Continental South Asia and Ceylon.

Sepyra, *Wlk.* sulcator, *Wlk.* finator, *Wlk.* rufimanus, *Wlk.* inficiens, *Wlk.* proctotuperator, *Wlk.* spinator, *Wlk.* tentator, *Wlk.* fascicornis, *Wlk.* pandens, *Wlk.* dividens, *Wlk.* terminalis, *Wlk.* tarsalis, *Wlk.* divisicornis, *Wlk.*

Eastern Archipelago.

properator, *Wlk.* ducator, *Wlk.* signator, *Wlk.* motator, *Wlk.* gladiator, *Wlk.* lanceolator, *Wlk.* æquator, *Wlk.* ensator, *Wlk.* validicornis, *Holmgren.* nasuta, *Holmg.* argentigera, *Holmg.*

Australia.

Proxenus, *Wlk.* Eracon, *Wlk.* Nyssa, *Wlk.* Dexius, *Wlk.* fabricator, *Wlk.* indignator, *Wlk.* internata, *Wlk.* cineraria, *Wlk.* subfasciata, *Wlk.*

H. CINCTICORNIS. *Fœm.*—Nigra; antennæ fere filiformes, basi piceæ, articulo 2o apice articuloque 3o rufis; abdomen sublanceolatum, thorace brevius, lateribus apiceque albo pilosis; pedes rufi, femoribus posticis subincrassatis; alæ cinereæ.

Female.—Black. Head and thorax largely punctured. Head broader than the thorax. Antennæ slender, nearly filiform, a little longer than the thorax; first joint slender, piceous; second piceous, red towards the tip, much longer than the third, which is red. Thorax shining. Petiole very short. Abdomen sublanceolate, shorter than the thorax, with white hairs on each side and towards the tip. Legs red; hind femora slightly incrassated. Wings cinereous; veins piceous; ulna about one-sixth of the length of the humerus; radius and cubitus obsolete. Length of the body 2¼ lines.

Corsica. In the collection of the Rev. T. A. Marshall.

H. FUMIPENNIS. *Mas.*—Nigra; antennæ fere filiformes, articulo 1o fulvo; abdomen ovatum, thorace multo brevius; pedes rufi, femoribus posticis subtus inermibus subangulatis; alæ cinereæ, dimidio apicali nigricante; alæ anticæ macula subcostali nigricante.

Male.—Black. Head and thorax largely punctured. Head a little broader than the thorax. Antennæ stout, very compact, nearly filiform, as long as the thorax; first joint tawny. Prothorax subquadrate, more than twice as broad as long. Sutures of the

parapsides distinct. Abdomen oval, smooth, shining, a little narrower and much shorter than the thorax. Legs red; hind femora incrassated, with a slight angle on the under side. Wings cinereous; apical half blackish. Fore wings with a blackish subcostal spot at the end of the vein, which is black; ulna not more than one-fourth of the length of the humerus; radius nearly as long as the ulna; cubitus extremely short. Length of the body 1¾ line.

Corsica. In the collection of the Rev. T. A. Marshall.

H. NIGRICOLA. *Mas.*—Nigra, sat gracilis; antennæ filiformes; scutellum bidentatum; metathorax valde declivis; abdomen subcompressum, fere ellipticum, thorace brevius; alæ cinereæ.

Male.—Black, rather slender, with cinereous tomentum. Head and thorax very thickly and minutely punctured. Head very little broader than the thorax; front very deeply excavated. Antennæ filiform. Prothorax subquadrate, about four times as broad as long. Sutures of the parapsides distinct. Scutellum with two short stout apical teeth. Metathorax perpendicular. Petiole very short. Abdomen smooth, nearly elliptical, slightly compressed, shining towards the base, shorter and a little narrower than the thorax; first and second segments very large. Hind femora incrassated. Wings cinereous; veins black, with the usual structure. Length of the body 1¾ line.

Gambia.

H. FASCICORNIS. *Fœm.*—Nigra; antennæ subfiliformes, fascia latissima rufa; tegulæ rufæ; scutellum bidenticulatum; abdomen ovatum, thorace brevius, plagis duabus subapicalibus argenteo tomentosis; pedes rufi, femoribus posticis inermibus; alæ anticæ cinereæ, plaga subcostali parva nigricante, plaga exteriore magna diffusa fuscescente.

Female.—Black. Head and thorax very thickly and minutely punctured, with cinereous pubescence. Head a little broader than the prothorax; front deeply excavated. Antennæ inserted near the mouth, subfiliform, a little longer than the thorax; scape red, except towards the base; flagellum red towards the base. Prothorax large, quadrate. Sutures of the parapsides slightly defined; tegulæ red; scutellum with two minute apical teeth. Metathorax short, decumbent, with four keels; sides with a silvery pile. Petiole extremely short. Abdomen oval, smooth, shining, acute at the tip, shorter than the thorax; a patch of silvery pile on each side near the tip; dorsal segments forming a deep edge on each side of the ventral segments. Legs red; hind femora unarmed, much incrassated. Wings cinereous. Fore wings with a small blackish patch at the end

of the vein, and with a large exterior diffuse brownish patch; veins black; ulna about one-fourth of the length of the humerus; radius longer than the ulna; cubitus very short. Length of the body 2¾ lines.

Bombay.

H. TARSALIS. *Mas.*—Nigra; antennæ filiformes; scutellum bidenticulatum; metathorax brevis, declivis, unisulcatus; abdomen ovatum, thorace multo brevius; femora postica inermia; tarsi quatuor anteriores rufi; alæ anticæ cinereæ, plaga parva subcostali fuscescente.

Male.—Black, stout, with hoary tomentum. Head and prothorax extremely minutely punctured. Head as broad as the thorax; front very deeply excavated. Antennæ filiform, rather stout, longer than the thorax. Prothorax large, subquadrate. Sutures of the parapsides distinct; scutellum with two minute apical teeth. Metathorax short, declining, with a slight longitudinal furrow. Petiole very short. Abdomen oval, smooth, much shorter than the thorax; first segment shining, without tomentum, very large. Hind femora unarmed, much incrassated; four anterior tarsi red. Wings cinereous; veins black. Fore wings with a small brownish patch behind the ulna, which is about one-fourth of the length of the humerus; radius shorter than the ulna; cubitus very short. Length of the body 1¾ line.

Bombay.

H. DIVISICORNIS. *Fœm.*—Nigra; antennæ filiformes, basi apiceque rufæ; tegulæ rufæ; scutellum bidentatum; abdomen sublanceolatum, thorace paullo longius; pedes rufi, femoribus posticis inermibus; alæ cinereæ.

Female.—Black, shining. Head and thorax very minutely punctured, with cinereous tomentum. Head as broad as the prothorax; front very deeply excavated. Antennæ filiform, inserted near the mouth, a little longer than the thorax; scape red; flagellum red towards the base and at the tip. Prothorax large, subquadrate. Sutures of the parapsides strongly defined; tegulæ red; scutellum with two apical teeth. Metathorax short. Petiole extremely short. Abdomen smooth, sublanceolate, a little longer than the thorax, keeled beneath; first segment very large. Legs red; hind femora unarmed, much incrassated. Wings cinereous. Fore wings not extending to the tip of the abdomen; veins black, in structure much like those of H. fascicornis. Length of the body 1¾ line.

Bombay.

H. CINERARIA. *Fœm.*—Nigra, crassa; antennæ graciles, filiformes; tegulæ testaceæ; scutellum apice unispinosum; metathorax bispinosus; abdomen sessile, subtiliter punctatum, fere ellipticum, thorace non longius; femora postica subtus subangulata; alæ nigricantes, basi cinereæ.

Female.—Black, very robust. Head thickly clothed with hoary hairs on each side of the front, which is very deeply excavated for the reception of the first joint of the antennæ. Antennæ inserted near the mouth, slender, filiform, much longer than the thorax. Thorax roughly punctured. Prothorax large, subquadrate. Sutures of the parapsides well defined; tegulæ testaceous; scutellum armed at the tip with a stout obtuse spine. Metathorax with two obtuse shorter spines. Abdomen shining, thick, sessile, finely punctured, nearly elliptical, acute at the tip, not longer than the thorax. Legs pilose. Hind femora incrassated; edge beneath dilated and slightly angular near the tip. Wings blackish, cinereous towards the base; veins black; ulna very short. Length of the body 5½ lines.

It differs widely from all the other described species of the genus, and excels them all in size.

South Australia.

H. SUBFASCIATA. *Fœm.*—Nigra; antennæ filiformes; metathorax fascia interrupta cinereo pubescente; scutellum obtuse unidentatum; metathorax bidentatus; abdomen sessile, thorace longius, apicem versus lanceolatum; alæ anticæ fuscescentes, plaga subcostali nigricante.

Female.—Black, stout, with cinereous pubescence. Head thickly punctured; front very deeply excavated for the reception of the first joint of the antennæ. Antennæ slender, filiform, much longer than the thorax. Thorax roughly punctured. Prothorax rather large. Sutures of the parapsides strongly marked; an interrupted band of cinereous pubescence at the base of the scutellum, which is armed at the tip with an obtuse and stout tooth. Metathorax with two stout teeth. Abdomen sessile, smooth, shining, longer than the thorax; apical part lanceolate, about half the length of the preceding part. Hind femora incrassated. Wings with black veins. Fore wings brownish, with a blackish patch adjoining the ulna, which, like the cubitus, is very short; humerus about twice the length of the ulna. Length of the body 4½ lines.

The wholly dark-coloured wings distinguish it from the other Halticellæ.

Australia.

Genus CHALCIS.

Europe.

flavipes, *Fabr.* femorata, *Panz.* distinguenda, *De Lap.* intermedia, *Nees.* cingulata, *De Lap.* minuta, *Linn.* podagrica, *Fabr.* pusilla, *Rossi.* inermis, *Fonsc.* scubiculata, *Foerst.* vitripennis, *Foerst.* obtusata, *Foerst.* punctulata, *Foerst.* angulosa, *Foerst.* scirripoda, *Foerst.* tricolor, *Foerst.* obtusidentata, *Costa.*

North America.

annulipes, *De Lap.* albifrons, *Walsh.*

Mexico.

compacta, *Wlk.* comitator, *Wlk.* pubescens, *Wlk.*

West Indies.

pendator, *Wlk.* restituta, *Wlk.* incerta, *Cresson.* robusta, *Cress.*

Galapagos.

Cabira, *Wlk.*

South America.

caudata, *Fabr.* producta, *Oliv.* Mnestor, *Wlk.* Orseis, *Wlk.* Augarus, *Wlk.* fervida, *Wlk.* vicaria, *Wlk.* stylata, *Wlk.* aculeata, *Wlk.* eurytomoides, *Wlk.* implexa, *Wlk.* decreta, *Wlk.* separata, *Wlk.* concitator, *Wlk.* Panamensis, *Holmg.*

North Africa.

albicrus, *Klug.* brevicornis, *Klug.* pubescens, *Klug.* agilis, *Klug.* pumila, *Klug.*

West Africa.

Visellus, *Wlk.* Amphilochus, *Wlk.* Polyctor, *Wlk.* Resus, *Wlk.* Amenocles, *Wlk.*

South Africa.

microlinea, *Wlk.* varipes, *Wlk.*

Arabia.

decorata, *Klug.* This species is a peculiar form of the genus; in the female the apical part of the abdomen forms a slender cylindrical tube, like that of the South American C. separata.

Continental South Asia and Ceylon.

pusilla, *Fabr.* Euplææ, *Hope.* (Lasus? *Wlk.*) Alphius, *Wlk.* responsator, *Wlk.* inclinator, *Wlk.* Amphissa, *Wlk.* dividens, *Wlk.* pandens, *Wlk.* tarsalis, *Motsch.* alternipes, *Wlk.* mansueta, *Wlk.* lugubris, *Wlk.* semirufa, *Wlk.*

Eastern Archipelago.

sociator, *Wlk.* pulchripes, *Holmg.*

Australia.

Phya, *Wlk.* Teuta, *Wlk.* nitator, *Wlk.* opponens, *Wlk.* Ucalegon, *Wlk.* Sidnica, *Holmg.*

Several species of this genus, from remote parts of the world, have much resemblance to each other. The resemblance of the insects of Europe with those of North America and with those of Japan is well known; C. minuta inhabits Europe and North America; C. flavipes is found in Europe and in Japan.

Chirocera is the generic name givén by Latreille to C. pectinicornis, *Latr.* = C. femoralis, *Latr.* = Chalcis Alexion, *Wlk.* A. H. Haliday has suggested the name Hippota for the genus, as the name Chirocera was previously used, but it can hardly be separated from Chalcis, as the female resembles that genus in structure.

CHALCIS PUBESCENS. *Fœm.*—Nigra; antennarum articulus 1us flavus; 2us fulvus; tegulæ fulvæ; abdomen ovatum, apicem versus fulvo pubescens; femora postica vitta superiore strigaque inferiore basali flavis; tibiæ supra fulvæ; tarsi subtus fulvi; alæ anticæ basi fuscescentes.

Female.—Black, pubescent, minutely punctured. Antennæ subclavate, shorter than the thorax; first joint yellow; second tawny. Tegulæ tawny. Petiole extremely short. Abdomen oval, shining, as long as the thorax; first segment nearly as long as all the following which are thickly clothed with rather long tawny hairs. Oviduct hardly exserted. Hind femora with a yellow stripe above and along the basal part beneath. Knees tawny. Tibiæ tawny above. Tarsi tawny beneath. Wings cinereous; veins black. Fore wings brownish towards the base; ulna much shorter than the humerus; radius less than half the length of the ulna; cubitus less than half the length of the radius: stigma very small. Length of the body 3½ lines; of the wings 7 lines.

Very near allied to C. implexa, from which it may be distinguished by the yellow basal joint of the antennæ and by the yellow stripe on the hind femora.

Mexico. In the collection of the late Dr. Sichel.

C. VARIPES. *Fœm.*—Nigra; antennarum articulus 1us rufus; scutellum bidentatum; tegulæ albæ; metathorax abrupte declivis; abdomen longi-ovatum: pedes rufi, femoribus quatuor anterioribus nigris apice albis, femoribus posticis denticulatis apice albis, tibiis basi apiceque albis; alæ diaphanæ.

Female.—Black, stout, with cinereous pubescence. Head and thorax thickly and minutely punctured. Head very little narrower than the thorax. Antennæ subclavate, shorter than the thorax; first joint red. Prothorax subquadrate, its length in the middle not more than one-eighth of its breadth. Sutures of the parapsides slight; scutellum with two short stout apical teeth. Tegulæ white. Metathorax perpendicular. Petiole very short. Abdomen elongate-oval, smooth, shining, acute at the tip, narrower and a little longer than the thorax; first segment very large. Legs red; four anterior femora black, white towards the tips; hind femora much incrassated, with white tips, armed beneath with several small teeth; tibiæ white towards the base and towards the tips. Wings pellucid; veins black; ulna about one-third of the length of the humerus; radius less than half the length of the ulna. Length of the body 3¼ lines.

South Africa.

C. SEMIRUFA. *Mas.*—Nigra; prothorax brevissimus; scutellum inerme; tegulæ pallide flavæ; abdomen rufum, brevi-ellipticum; pedes pallide flavi, coxis femoribusque nigris his apice flavis, femoribus posticis subtus denticulatis; alæ diaphanæ.

Male.—Black, stout, with cinereous tomentum. Head and thorax thickly and minutely punctured. Head as broad as the thorax. Prothorax very short Sutures of the parapsides distinct; scutellum unarmed; tegulæ pale yellow. Metathorax erect. Petiole very short. Abdomen red, smooth, shining, short-elliptical, much shorter than the thorax; first segment very large. Legs pale yellow; coxæ and femora black, the latter with yellow tips; hind femora very thick, with very minute teeth. Wings pellucid; veins black; ulna about half the length of the humerus; radius less than half the length of the ulna; stigma very short. Length of the body 1⅔ line.

Moulmein.

C. MANSUETA. *Fœm.*—Nigra, sat gracilis; antennarum articulus 1us basi rufus; tegulæ flavo-albæ; scutellum apice bidentatum;

metathorax abrupte declivis; abdomen brevi-lanceolatum, thorace longius; pedes pallide flavi, coxis femoribusque rufis his subtus denticulatis, femoribus tibiisque quatuor anterioribus nigro latissime unifasciatis; alæ diaphanæ.

Female.—Black, rather slender. Head and thorax thickly and minutely punctured. Head as broad as the thorax. Antennæ subclavate, rather shorter than the thorax; first joint red towards the base. Length of the prothorax about one-fourth of its breadth. Sutures of the parapsides distinct; tegulæ yellowish white; scutellum with two short stout apical teeth. Metathorax short, perpendicular. Petiole very short. Abdomen smooth, shining, short-lanceolate, somewhat longer than the thorax; first segment very large. Legs pale yellow; hind coxæ and hind femora red, the latter very thick and with several minute teeth beneath; four anterior femora and tibiæ with a very broad black band on each. Wings pellucid. Fore wings with black veins; ulna about half the length of the humerus; radius less than half the length of the ulna; cubitus extremely short. Length of the body 2 lines.

Hong Kong.

C. ALTERNIPES. *Mas.*—Nigra; scutellum bidenticulatum; metathorax abrupte declivis; abdomen ovatum; femora postica rufa, subtus denticulata; femora tibiæque quatuor anteriora basi apiceque rufa; tarsi rufi; alæ cinereæ.

Male. Black, stout, with cinereous tomentum. Head and thorax thickly and minutely punctured. Head as broad as the thorax. Antennæ subclavate, a little shorter than the thorax. Prothorax subquadrate, its length equal to about one-sixth of its breadth. Sutures of the parapsides well defined. Scutellum with two minute apical teeth. Metathorax abruptly decumbent. Petiole very short. Abdomen oval, smooth, a little shorter than the thorax; first segment large, shining, without tomentum. Hind femora red, very thick, with several very minute teeth beneath; four anterior femora and tibiæ red at the base and at the tips; tarsi red. Wings cinereous. Fore wings with black veins; ulna about half the length of the humerus; radius much shorter than the ulna; cubitus extremely short. Length of the body 2¼ lines.

Hong Kong.

C. LUGUBRIS. *Fœm.* — Nigra, crassa; scutellum bidentatum; abdomen ovatum, thorace longius, segmentorum marginibus posticis cinereo pubescentibus; femora postica subtus denticulata; pedes quatuor anteriores genubus tibiis apice tarsisque fulvis; alæ cinereæ.

The following species have been described by me:—

Dares (acuta? *Fabr.*), Pielus, Enyo, Accila, torrida, luteipennis, dux, lanceolata, costalis, demonstrata, imitator, obliterans, congrua, decisa, sordida, discalis, mesomelas, melanoptera, discolor, nebulosa, leucotelus, chrysomerus, transversa, concitator, certa, effecta, contacta, destinata, crocata, appressa, aperta, cerina, basilica, composita, admixta, defuncta, adaptata, correcta, exinamiens, scissa, æmula, adsita, attalica, contermina, commoda, alienata, dimota, disposita, expleta, descripta, exhauriens, adjuncta, blanda, vacillans, terminalis, æqualis, contributa, celsa, detracta, annulifera, depicta, amæna, cognata, demota, apparata, deducta, attracta, referator, illata.

Isle Pana.

maculata, *Holmg.* variegata, *Holmg.* pallida, *Holmg.*

The five following species are probably South American; they are described in the Annuario del Museo Zoologica (ii. 68—69), by Prof. Costa, who does not mention where they dwell:—multinotata, strigosa, capitulata, quinquesignata, lobata.

Arabia.

pensilis, *Klug.*

Hindostan and Ceylon.

nigrorufa, *Wlk.* providens, *Motsch.* elongatula, *Motsch.*

Australia.

delicatula, *Wlk.*

In S. pensilis and in S. leucotelus the apical part of the female abdomen is cylindrical and very slender, like that of the two species of Chalcis before mentioned.

Numerous groups and series of species may be formed of the South American Smicræ by noticing the various length of the petiole, by tracing the gradual change of structure in the abdominal segments of the female, and by observing the many "colorational patterns" of the body and the shading of one kind of markings into another. Their chief habitation is the Amazon region, where it is probable that there are very many species yet unknown, and there is a large field for investigation in the discovery of new species and in studying their geographical distribution before they and their prey are diminished by the cultivation of the land. They are comparatively scarce in North America, where the British S. nigrifex dwells with some other kinds that have more resemblance to the South American forms.

North America.

nigricornis, *Fabr.* pygmæa, *Fabr.* debilis, *Say.* amœna, *Say.* Side, *Wlk.* fulvescens, *Wlk.* maculata. transitiva, *Wlk.*

Mexico.

punctata, *Fabr.* Lamyrus, *Wlk.* (dimidiata? *Fabr.*) Pylas, *Wlk.* (picta? *Fabr.*) abdominalis, *Wlk.* divisa, *Wlk.* erythrina, *Wlk.* tenebrosa, *Wlk.* scutellaris, *Sich.* dimidiata, *Sich.* pompiloides, *Wlk.* conjungens, *Wlk.*

West Indies.

villosa, *Oliv.* Isle St. Trinity. Fidius, *Wlk.* Ampyx, *Wlk.* Pratinas, *Wlk.*

The following species inhabit Cuba and are described by Cresson:—

A. Fore wings dark fuscous.	
a. Thorax not entirely red. - - -	Lanieri.
b. Thorax entirely red. - - - -	coccinea.
B. Fore wings fusco-hyaline. - - -	intermedia.
C. Fore wings hyaline or subhyaline.	
a. Body reddish orange. - - - - -	ignea.
b. Body luteous.	
* Tibiæ black except at the base. - -	Gundlachii.
** Tibiæ not black. - - - -	Eubule.
c. Body yellow.	
* Body varied with black.	
† Legs varied with black.	
‡ Prothorax with a black disk. - - -	pulchra.
‡‡ Prothorax with a small black spot. - -	nigropicta.
†† Legs wholly pale. - - - -	pallens.
** Body wholly pale. - - - -	immaculata.
d. Body ferruginous.	
* Petiole very slender. - - - -	petiolata.
** Petiole stout. - - - - -	scutellaris.
e. Body black, varied with yellow. - -	flavopicta.

South America.

clavata, *Fabr.* Ghilianii, *Spinola.* flavicans, *Spin.* annulipes, *Spin.* Leprieurii, *Spin.* bicolor, *Brullé.* emarginata, *Fabr.* flava, *Fabr.* variegata, *Fabr.* subfasciata, *Holmg.*

Male. Black, pilose, rather finely punctured. Antennæ filiform, red beneath, a little shorter than the thorax. Metathorax scabrous. Petiole longitudinally furrowed, not more than one-sixth of the length of the abdomen. Abdomen red, smooth, fusiform, as long as the thorax. Hind femora with a large fusiform yellow spot on the outer side, and on the inner side with a very broad yellow stripe which is much narrower towards the tip; a slender red stripe beneath along the minute black teeth. Wings cinereous, brown towards the base; veins blackish. Fore wings with the ulna about half the length of the humerus; radius rather shorter than the ulna; cubitus less than half the length of the radius; stigma distinct. Length of the body 3½ lines; of the wings 8 lines.

Mexico. In the late Dr. Sichel's collection.

S. DECORA. *Mas.*—Flava; caput nigrum; antennæ nigræ, articulo 1o subtus flavo; mesothorax macula nigra conica truncata; scutellum bidentatum, vitta brevi lata nigra; metathorax areolatus; petiolus longus, gracilis; abdomen ellipticum, disco apiceque nigris; coxæ posticæ longissimæ, vitta exteriore nigra; tibiæ posticæ nigræ, basi flavæ; tarsi postici pallide rufescentes; alæ anticæ cinereæ, maximæ, fuscescente marginatæ, striga subcostali obscure fusca.

Male. Yellow. Head black. Antennæ black, stout, filiform; scape yellow beneath. Mesothorax with a truncate-conical black spot, which occupies the hind part of the scutum and of the parapsides; scutellum with a short broad black stripe, armed with two rather large teeth. Metathorax divided into distinct compartments by a longitudinal ridge and by three arched transverse ridges. Petiole slender, much longer than the metathorax and not much shorter than the abdomen. Abdomen elliptical, much shorter and narrower than the thorax; disk above and apical part black. Hind coxæ very long, with a black stripe on the outer side; hind femora armed with ten small and with four very small black teeth; hind tibiæ black except towards the base; hind tarsi pale reddish. Fore wings very ample, cinereous, especially clouded with brown about the borders and along the costa; a dark brown streak along the ulna; veins black; ulna full half the length of the humerus; radius as long as the ulna; cubitus long; spurious veins very distinct. Length of the body 5 lines; of the wings 10 lines.

This is a very peculiar form of the genus, and is distinguished by the long petiole, the long hind coxæ, the very large wings, and the cubitus, which extends much beyond the stigma.

Brazil.

Erratum.—Page 46, line 5, *for* cubiculata *read* scrobiculata.

NOTES

ON

CHALCIDIÆ.

PART IV.

CHALCIDIDÆ, LEUCOSPIDÆ, AGAONIDÆ, EUCHARIDÆ, PERILAMPIDÆ, ORMYRIDÆ, ENCYRTIDÆ.

BY

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NOTES ON CHALCIDIÆ.

PART IV.

CHALCIDIDÆ.

Genus EPITRANUS.

West Indies.

fulvescens, *Wlk.* castaneus, *Cresson.*

West Africa.

observator, *Wlk.*

South Africa.

ruptator, *Wlk.* formicarius, *Wlk.*

Eastern Archipelago.

impulsator, *Wlk.*

Australia.

Teleute, *Wlk.*

Genus EUDOXIMA.

This is a very remarkable form; it has slender hind femora, and thus is without one of the distinguishing characters of the family.

E. TRANSVERSA, *Wlk.* Ega.

LEUCOSPIDÆ.

The Leucospidæ, which include the largest species of the tribe and are parasites of aculeate Hymenoptera, are comparatively few in species and individuals, and are unknown in England and in the more northern part of Europe. In general they do not vary much in structure, colour and markings; all those in Europe and Arabia belong to one group of the genus, and this group also includes the South African L. ornata, L. Sinensis, exornata and Japonica in continental Asia; L. Aruica in Aru; and L. Australis in South Australia. Another group is distinguished by the contraction of the abdomen at the base; it occurs in North Africa; and L. atra of Hindostan, L. Aruina of Aru, and L. antiqua of New Caledonia belong to it. In all these species there is no trace of a metallic hue, and thus no blending with the general character of the other Chalcidiæ; and in North America this distinction is attained also by L. Shuckardi and Canadensis; but in L. subnotata the metallic hue appears on the front. Towards the equator this lustre is general on the body in L. Mexicana, Cayennensis, Tapayana, speifera and Egaia; it does not occur in L. Santarema, but in this the black ground hue of the European and Arabian species is replaced by red. The Chilian L. Hopei is another type, of which the red antennæ are a peculiar character. There is another form of the genus in L. leucotelus; it has no metallic hue nor pale markings, and its wings are black. Leucospis is parasitic on aculeate Hymenoptera, but has not followed its prey northward so far as the latter extends, and being of comparatively rare occurrence it has only a slight control over its victims. The genus Polistomorpha is distinguished by the elongated face, by the basal contraction of the abdomen, and by the less incrassated hind femora. In the genus Marres the head is deeply excavated.

L. Japonica. *Fœm.* Nigra; antennæ apice rufescentes, articulo 1o flavo apice supra nigro; prothorax fascia postica abbreviata flava; abdomen maculis duabus basalibus quadratis fasciaque subapicali flavis; oviductus scutelli apicem attingens; coxæ posticæ flavo unistrigatæ; femora postica octodentata, fascia exteriore basali arcuata flava; tarsi rufescentes; alæ nigricantes.

Female. Black, very thickly and minutely punctured, with short cinereous pubescence. Antennæ stout, subclavate, dull reddish at the tips; first joint yellow, black at the tip above. Prothorax with a slight transverse, smooth, abbreviated yellow ridge near the hind border. Abdomen with a quadrate yellow spot on each side near the

base, and with a broad yellow band near the tip. Sheath of the oviduct piceous, recurved to the tip of the scutellum. Hind coxæ with a yellow lanceolate streak above; hind femora with a curved yellow band on the outer side near the base, armed beneath with eight minute spines; knees and tarsi reddish. Wings blackish. Length of the body 5 lines.

The short oviduct of L. Sinensis, and the large spines of its hind femora, besides other characters, sufficiently distinguish it from this species.

Japan.

L. Australis. *Mas.* Nigra; frons rufo quadrimaculata; antennarum articulus 1us luteus, apice supra niger; prothorax striga discali transversa fusiformi rufa; abdominis dorsum dimidio apicali rufo strigis duabus lateralibus latis lanceolatis nigris; pedes rufi, coxis femoribusque nigris, femoribus posticis subtus denticulatis, tibiis anticis et posticis extus nigro strigatis; alæ anticæ fuscæ, apud costam nigricantes.

Male. Black, very thickly and minutely punctured, with short cinereous pubescence. Front with two red spots on each side. Antennæ subclavate; first joint luteous, black at the tip above. Prothorax with a transverse fusiform red streak in the disk. Abdomen red for full half the length from the tip; under side wholly black, emitting a broad black lanceolate streak on each side towards the dorsum. Legs red; coxæ and femora black; hind femora with several minute teeth beneath; fore tibiæ and hind tibiæ with a black streak on the outer side. Wings brown. Fore wings blackish along the costa. Length of the body 5 lines.

South Australia.

L. exornata. *Fœm.* Nigra; antennæ basi subtus luteæ; prothorax linea transversa postica lutea; mesothorax lineolis duabus obliquis luteis; abdomen maculis duabus basalibus triangularibus, fascia postica arcuata guttisque duabus elongatis apicalibus luteis; oviductus mesothoracem attingens; coxæ posticæ luteo univittatæ; femora postica luteo unifasciata; tarsi picei; alæ nigricantes.

Female. Black, scabrous, with cinereous pubescence. Antennæ subclavate; scape luteous beneath. Prothorax with a luteous transverse line near the hind border. Mesothorax with a short slender oblique luteous line on each side, near the base of the fore wing. Abdomen with a luteous elongated triangular spot on each side of the first segment, which is long and slightly straightened; an arched luteous band on the fourth segment, and an elongated luteous dot on

each side of the tip. Oviduct extending to the mesothorax. Hind coxæ with a luteous stripe above; hind femora with a luteous band near the base on the outer side, armed with ten or eleven minute teeth; knees luteous; tarsi piceous. Wings blackish; veins black. Length of the body 6 lines; of the wings 10 lines.

Hong Kong.

AGAONIDÆ.

Fig. 2. Fig. 1. Fig. 3.

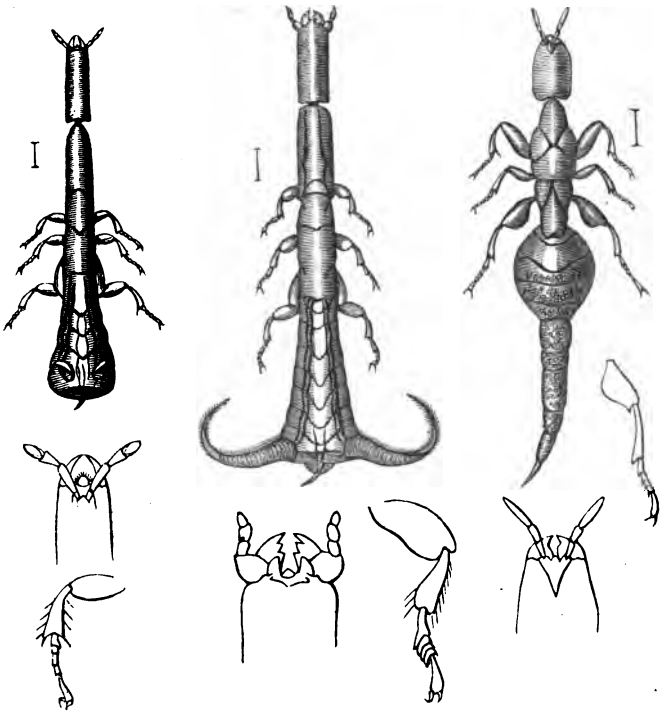

Fig. 1. Apocrypta paradoxa.
Fig. 2. Apocrypta perplexa.
Fig. 3. Sycocrypta cœca.

These figures are not like the preceding and succeeding illustrations in these notes, from the drawings of A. H. Haliday, but are copied from the plate in Dr. Coquerel's memoir, here mentioned. See 'Revue et Magasin de Zoologie,' Ser. 2, vol. vii. 365 and 422.

The Leucospidæ appear to be the highest development of the Chalcidiæ; and the Agaonidæ will be said to be the most rudimentary form of the tribe, or the earliest created among them, or the first "won from the void and formless infinite." In them affinities may be found between the Chalcidiæ and other tribes of Hymenoptera, for links between tribes will be sought in vain among the more organized forms. The above figures exhibit the most aboriginal structure of the Agaonidæ.

The Agaonidæ appear as yet chiefly in three different aspects, and in three different regions. The first region is the Mauritius, where they have been discovered by the researches of Dr. Coquerel. Here the three species figured are said to be "condemned to eternal darkness" in the central regions of figs. These figs are the fruit of Ficus terragena, and are unfit for human food. Dr. Coquerel found the three species (Apocrypta paradoxa, A. perplexa and Sycocrypta cœca) in abundance in the interior of these figs, together with great numbers of a fourth species, which he named Chalcis? explorator, and which he believed to be parasitic on the other three species. However, he did not ascertain it to be so, but merely observed that the four species were mingled together, and he had previously seen the explorator flying about the outside of the figs. The other three species, he observes, are remarkably inactive; when disturbed they roll themselves together and remain motionless: they have no eyes, no ocelli, no palpi, no maxillæ, no wings; but have powerful mandibles. Dr. Coquerel mentions that they have analogy with Scleroderma contracta, and supposes that the males are winged and unknown, and may have their place next to Scleroderma. Scleroderma has no near affinity with the Bethylidæ, and has been supposed by some to belong to the Mutillidæ, and by others to be the female of Myzine; it has some resemblance to the female Australian and South American Thynni, and by these connections the primitive and semichaotic forms discovered by Dr. Coquerel expand into the numerous and powerful tribe of aculeate Hymenoptera, surpassing other insects in intellect, of which the wasp and the bee are the most familiar examples, though a great part control other orders of insects, by using them as food for their young. Scleroderma seems to have more affinity with Typhlopone, the "worker" of Labidus, and with Dichthadia glaberrima, the supposed female of Dorylus; and thereby the multitudinous tribe of ants, whose economy is so remarkable, emerges from the blind and radical Apocryptæ and Sycocryptæ, the

perpetual dwellers in the interior of figs. But the affinity of these two genera to the Chalcidiæ is more evident, and appears by several connecting links in the Agaonidæ; and thus the near relations to the general ancestors of the thousands, and perhaps tens of thousands, of the Chalcidiæ species, the tribe being considered in unity, are cradled in figs. The Chalcis? explorator of Dr. Coquerel is an Idarnes, and has a resemblance to the Podagrion, figured in Part 2, but is much smaller, has a much longer oviduct, and has slender hind femora. It flits about the outside of figs, and by means of its long oviduct it comes into juxtaposition with the blind inhabitants within, of which it is a relative, though by many removes. It, doubtless, wings its way from fig to fig when full grown, but the succession of the other fig-dwellers is not known. The following species of this family have been observed in the figs of Ficus Indica, in Hindostan, by Sir Walter Elliot, who saw several other species of insects feeding on the fig-juice that flowed, in consequence of the occupations of the Agaonidæ within. He has remarked that one of the genera resembles some Hymenoptera and Termes, or the white ant, in having a working class as well as males and females.

Genus SYCOBIA.

Fœm. Corpus gracile, sat planum, fere glabrum. Caput longi-quadratum, antice paullo latius, prothorace latius et paullo longius. Oculi parvi, laterales, depressi. Ocelli nulli. Mandibulæ graciles, arcuatæ, bidentatæ, caput longe superantes. Antennæ 11-articulatæ, clavatæ, apud os insertæ, capite paullo longiores; articulus 1us longus, sat crassus. Prothorax conicus, capite paullo brevior. Scutum parvum; parapsidum suturæ bene determinatæ; scutellum rhomboideum. Metathorax magnus. Abdomen sessile, thoraci æquilongum. Oviductus tubiformis, abdominis dimidio æquilongus. Femora postica crassa. Alæ sat angustæ; cubitus abrupte declivis.

Female. Body slender, rather flat, shining, nearly smooth, extremely finely punctured when viewed under a microscope. Head elongate-quadrate, a little broader in front, broader and a little longer than the prothorax. Eyes small, lateral, flat. Ocelli none. Mandibles slender, curved, crossing each other, acutely bidentate at the tips, projecting much beyond the head, as long as its breadth. Antennæ 11-jointed, clavate, inserted close to the mouth, a little longer than the head; first joint stout, about two-fifths of the whole length; second clavate, less than half the length of the first; third and following as long as broad; club conical, compact, as long as the three preceding joints. Prothorax conical, narrow in front, a little shorter than the head. Scutum of the mesothorax small, triangular; parapsides very large, their sutures well defined; paraptera large,

triangular; scutellum rhomboidal. Metathorax large. Abdomen sessile, as long as the thorax and much broader; first segment slightly contracted; the following part oval, apparently composed of four segments. Oviduct tubiform, about half the length of the abdomen. Legs slender, moderately long; hind coxæ long; hind femora incrassated, shorter than the hind tibiæ, which are slightly setose; claws and pulvilli large. Wings rather narrow, moderately long; humerus extending to half the length; ulna about one-fifth of the length of the humerus; radius none; cubitus descending abruptly to the disk, much shorter than the ulna.

In the description of the antennæ the two minute, and sometimes obsolete joints following the second are not mentioned.

Neuter? Corpus breve. Caput transverse, brevi-ellipticum, prothorace multo latius. Antennæ 8-articulatæ, breves; articulus 1us valde incrassatus. Mesothoracis segmenta non bene determinata. Abdomen brevissimum; cerci duo apicales. Femora incrassata. Tibiæ dilatatæ, clavatæ. Alæ nullæ.

Worker?—Body short. Head much broader than the prothorax, transversely short-elliptical, its sides rounded and its breadth somewhat exceeding its length. Mandibles and eyes like those of the female. Antennæ slender, 8-jointed, about as long as the breadth of the head; first joint much incrassated, as long as all the other joints together; second clavate; third and following very short. Mesothorax a little narrower than the prothorax, much less developed than that of the female, the sutures between its dorsal segments and its lateral parts not being apparent. Metathorax much narrower than the mesothorax. Abdomen as broad as the metathorax, as long as the prothorax, with two apical appendages which equal it in length and resemble the cerci of the Dermaptera. Femora incrassated. Tibiæ dilated, clavate, as long as the femora. Tarsi slender, shorter than the tibiæ.

This genus has long curved mandibles, like those of Scleroderma, and has some resemblance to Apocrypta and Sycocrypta in the structure of the abdomen, and is more nearly allied to the latter genus than to the former, but it has eyes and wings, and the structure of the veins of these wings show it to be one of the Chalcidiæ tribe, and the cubitus descends abruptly to the disk of the wing as in other Agaonidæ.

S. BETHYLOIDES. *Fœm.*—Lutea; mandibulæ fulvæ; abdomen nonnunquam fulvum, apice pallide testaceum; alæ diaphanæ, venis pallide testaceis.

Female.—Luteous. Mandibles tawny. Antennæ slightly setose. Abdomen sometimes tawny, thinly setose towards the tip, which is pale testaceous. Wings pellucid; veins pale testaceous. Length of the body 2—2½ lines.

Worker?—Testaceous. Mandibles tawny. Length 1 line.

Genus IDARNES.

I. TRANSIENS. *Fœm.*—Lutescens; caput transversum; antennæ fuscæ, 10-articulatæ, basi pallide flavæ; prothorax longi-conicus; petiolus brevissimus; abdomen lanceolatum, thorace paullo longius; oviductus corpore plus duplo longior, basi tubiformis; femora subincrassata; alæ diaphanæ, venis pallide flavis.

Female. — Luteous, slender, shining, nearly smooth. Head transverse, short, as broad as the thorax; front erect. Eyes distinct. Antennæ brown, clavate, 10-jointed, pale yellow at the base; first and second joints long, slender; third and following short, transverse. Prothorax elongate-conical, rather flat. Metathorax long. Petiole very short. Abdomen lanceolate, a little longer than the thorax. Oviduct setose, much more than twice the length of the body, tubiform and like the body in colour towards the base; sheaths black and with the usual structure from thence to the tip; the tubiform part as long as the abdomen. Legs short, stout; coxæ long; fore femora incrassated; four posterior femora slightly incrassated; tibiæ with two apical spines. Wings pellucid; veins pale yellow; ulna longer than the humerus; radius nearly as long as the ulna; cubitus somewhat shorter than the radius, descending nearly directly to the disk. Length of the body 1 line.

This species has also been found in Ceylon by Dr. Thwaites.

I. STABILIS. *Fœm.*—Aureo-viridis; antennæ nigræ, basi pallide flavæ; oviductus corpore duplo longior, basi gracilis; pedes pallide flavi; alæ diaphanæ.

Female. — Golden green, much like the preceding species in structure. Antennæ black, clavate; first joint pale yellow. Sheaths of the oviduct black, thrice the length of the body, with the usual structure, not tubiform towards the base. Legs pale yellow. Wings pellucid; veins pale. Length of the body ¾ line.

In the structure of the apical part of the abdomen I. transiens retains some likeness to Sycobia, which affinity is not observable in I stabilis.

I. PTEROMALOIDES. *Fœm.*—Aureo-viridis; antennæ 9-articulatæ, subclavatæ, obscure fuscæ, basi luteæ; prothorax longiusculus; abdomen apice subattenuatum; pedes fulvi; alæ diaphanæ.

Female.—Golden green. Antennæ 9-jointed? dark brown, subclavate, inserted near the mouth, a little shorter than the thorax; first joint slender, luteous; club fusiform, longer than the two preceding joints together. Prothorax somewhat elongated. Mesothorax rather small; sutures of the parapsides indistinct. Abdomen convex, with four segments, a little longer, broader and deeper than the thorax, terminating in a lanceolate black tube, which is about one-sixth of the whole length. Legs tawny, slender. Wings pellucid; veins very pale yellowish; ulna much shorter than the humerus; radius shorter than the ulna; cubitus shorter than the radius, descending abruptly to the disk; stigma small, a little darker than the veins. Length of the body 1 line.

It has not the long oviduct which distinguishes the other species of the genus, and therefore it probably lives in its early state near the surface of the figs. In like manner various species of Callimome probe oak-apples, superficially or deeply according to the length of their oviducts.

The following genus does not belong to the Agaonidæ; it has some resemblance to Decatoma, and may be placed next to it till a new family is constituted for its reception.

Genus SYCOPHILA.

Mas.—Corpus convexum, subtilissime punctatus. Caput transversum; frons abrupte declivis. Oculi rotundi, convexi. Ocelli 3. Antennæ 9-articulatæ, filiformes, prope os insertæ, capiti et prothoraci ad unum æquilongæ. Prothorax quadratus. Parapsidum suturæ bene determinatæ. Metathorax brevis, abrupte declivis. Petiolus gracilis, cylindricus, metathorace longior. Abdomen ellipticum. Femora subincrassata. Femora antica basi subtus dentata. Alæ latæ; stigma magnum. *Fœm.*—Antennæ 10-articulatæ, subclavatæ. Petiolus brevis. Abdomen valde compressum, thorace brevius et multo angustius. Oviductus abdomen vix superans.

Male.—Body convex, very finely punctured. Head short, transverse, a little broader than the prothorax; front erect. Eyes round, convex. Ocelli distinct. Antennæ 9-jointed, filiform, slender, inserted near the mouth, as long as the head and the prothorax together; first and second joints slender, of the usual form; third, fourth, fifth and sixth long, linear; club lanceolate, less than twice

the length of the sixth joint. Prothorax quadrate, as long as broad. Mesothorax rather small; scutum shorter than the prothorax; sutures of the parapsides distinct: scutellum rather small. Metathorax short, abruptly slanting. Petiole slender, cylindrical, longer than the metathorax, shorter than the abdomen, which is elliptical, smooth and shining. Legs moderately long and stout; femora slightly incrassated; fore femora minutely dentate beneath towards the base; tarsi 5-jointed. Wings moderately broad. Fore wings with a large stigma adjoining the ulna; humerus more than half the length of the wing; ulna about one-sixth of the length of the humerus; radius very short; cubitus descending obliquely to the disk, shorter than the ulna.

Female.—Antennæ 10-jointed, subclavate. Petiole short. Abdomen much compressed, shorter and very much narrower than the thorax, with four distinct segments. Oviduct extending very little beyond the tip of the abdomen.

S. MEGASTIGMOIDES. *Mas.*—Lutea; oculi fulvi; antennæ apice nigræ; abdomen nigro uniplagiatum; alæ cinereæ, venis stigmateque fulvis.

Male.—Luteous, shining, nearly smooth. Eyes tawny. Ocelli black. Club of the antennæ black. A black patch on the disk of the abdomen. Wings cinereous; veins tawny. Fore wings with a very large tawny stigma adjoining the ulna. Length of the body $1\frac{3}{4}$—2 lines.

S. DECATOMOIDES. *Mas et fœm.*—Pallide lutea, nonnunquam fusco maculatum; abdomen *fœm.* nonnunquam fuscum; alæ diaphanæ, venis pallide luteis stigmate nigro. *Var.* β.—Alæ anticæ fusco unimaculatæ.

Male and female.—Pale luteous, occasionally with a brown spot on each segment of the thorax. Wings pellucid; veins pale luteous; stigma blackish or black. *Var.* β.—A brown spot adjoining the stigma in the disk of the wing. Length of the body $1\frac{1}{4}$—$1\frac{3}{4}$ line.

The latter species seems to be very abundant; both were found by Sir W. Elliot in figs.

The Agaonidæ occur in the Mediterranean region, where they have been used in ancient time and in modern time for caprification, a process which has been described by various writers. Two of these species have been named Blastophaga Sycomori and Sycophaga crassipes: the latter has a long oviduct, and therein resembles Idarnes.

Agaon paradoxum represents this family in Sierra Leone; it and

Blastophaga are connecting links between Idarnes and Sycobia, from which they differ in not having prominent mandibles.

Idarnes Carme inhabits St. Vincent's Isle, in the West Indies, and exceeds the other species in the length of its oviduct. Idarnes and Agaon were first included in one family by A. H. Haliday. Paphagus Sidero also inhabits St. Vincent's Isle and belongs to the Agaonidæ. Cirrospilus Acasta, a native of England, established as a genus by the names of Anthophorabia and of Melittobia, may be placed next to the Agaonidæ.

It has been often said that the present state of one region of the earth, as regards its vegetation and animal life, resembles the much earlier state of another region, and thus the aspects of the Agaonidæ in different regions represent successive epochs of time, and indicate how much there is yet to be learned by the investigation of figs: perhaps some forms may be discovered that are more elementary than the species here figured, and are more characteristic of "the dark backward and abyss of time."

There will be much difference of opinion as to whether the chain of affinities in the Agaonidæ is merely a proof of the unity of system, or whether individuals in some cases continue comparatively undeveloped and in other cases become comparatively highly organized, like as the same parts of plants are formed into thorns or into leaves or into flowers.

EUCHARIDÆ.

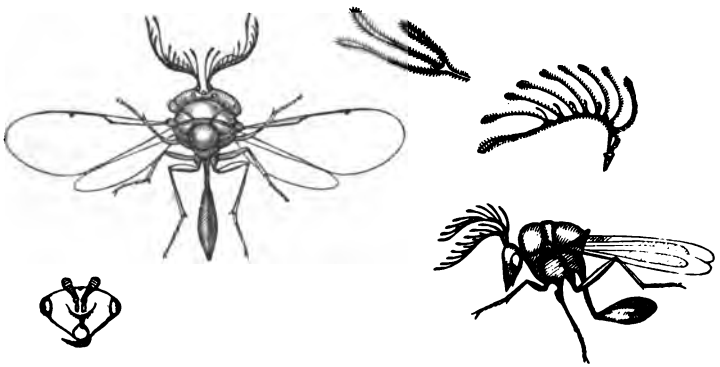

Fig. 1. Stilbula Volusus.

Fig. 2.

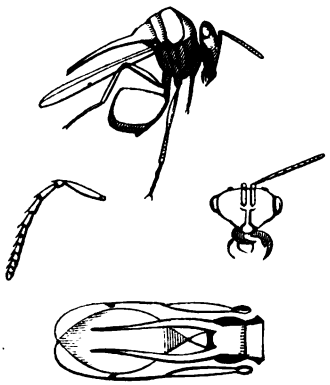

Fig. 3.

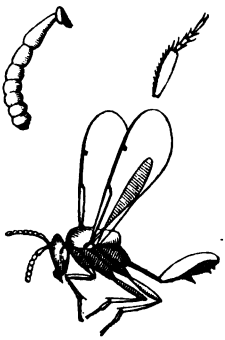

Fig. 2. Schizaspidia furcata.
Fig. 3. Eucharis Iello.

The Eucharidæ are remarkable on account of the great development of the mesothorax, which in some species extends to the tip of the abdomen and is finely sculptured. Most of the species may be arranged as follows:—

STILBULA, *Spinola.*

cyniformis, *Rossi.* bella, *Foerst.* Larymna, *Wlk.* smaragdina, *Wlk.* piceicornis, *Wlk.* delicatula, *Wlk.* implexa, *Wlk.* Volusus, *Wlk.* Fausta, *Wlk.* Valgius, *Wlk.* Zalates, *Wlk.*

EUCHARIS, *Latr.*

adscendens, *Fabr.* punctata, *Foerst.* Kollari, *Foerst.* Pyttalus, *Wlk.* rufiventris, *Wlk.* Theocles, *Wlk.* Iello, *Wlk.* Eribotes, *Wlk.* convergens, *Wlk.* deprivata, *Wlk.* testacea, *Motsch.*: this species is perhaps not a Eucharis.

SCHIZASPIDIA, *Westw.*

furcata, *Fabr.* cynipsea, *Wlk.* striatissima, *Wlk.* pallescens, *Wlk.* inexagens, *Wlk.* reflexa, *Wlk.* flavicornis, *Wlk.* atrata, *Wlk.* surgens, *Wlk.* apta, *Wlk.* Nasua, *Wlk.* furcifera, *Westw.* pertendens, *Wlk.* contigens, *Wlk.* plagiata, *Westw.* cyanea, *Wlk.*

THORACANTHA, *Latr.*

striata, *Perty.* Latreillii, *Guérin.* Anchurus, *Wlk.* apta, *Wlk.*

A few species inhabit South Europe, but the greater part are natives of South America or of Australia. E. adscendens has been recorded doubtfully to have occurred in England.

The genus Eucharissa, *Westw.*, is unknown to me.

PERILAMPIDÆ.

This family, like the Eucharidæ, has a gibbous and large mesothorax, and is few in species and in individuals. The genus Caratomus is placed by Foerster with the Sphegigasteridæ. Two genera may be separated from Perilampus as follows:—

A. Antennæ not pectinated. Colour generally metallic.
a. Scutellum extending hindward and forming a long stout spine. - - - - EUPERILAMPUS.
b. Scutellum not elongated. - - - PERILAMPUS.
B. Antennæ pectinated. Colour not metallic. APERILAMPUS.

Perilampus gloriosus is the type of Euperilampus, and P. discolor is the type of Aperilampus.

Philomides, a genus characterized by A. H. Haliday, is also distinguished by having no metallic tints. P. Paphius, *Haliday*, is the only species yet known and inhabits the Isle of Cyprus.

The genus Chrysomalla, *Foerst.* (type C. Roseri, *Foerst.*) is unknown to me. Elatus hardly belongs to this family: the two species described are Thenæ, *Wlk.*, and rufitarsus, *Foerst.*

Chrysolampus splendidulus, *Spinola*, is one of the links between the Perilampidæ and the Sphegigasteridæ; it is placed with the Perilampidæ by Foerster, who describes it by the name of Lamprostylus auricollis, and records another species, L. punctatus.

PERILAMPUS HEDYCHROIDES.—Aureo-viridis; caput apud ocellos et scutum nigra; antennæ piceæ, filiformes; abdomen subtilissime punctatum; genua fulva; tarsi flavi; alæ diaphanæ.

Golden green. Head deeply excavated in front; vertex black about the ocelli. Antennæ piceous, filiform, short, stout, compact. Thorax very largely punctured; scutum black; scutellum large; sutures of the parapsides well defined, remote from each other. Petiole short.

Abdomen gibbous, very finely punctured, much shorter than the abdomen. Knees tawny. Tarsi yellow. Wings pellucid; veins blackish; ulna less than half the length of the humerus; radius more than half the length of the ulna; cubitus very short; stigma small. Length of the body 1¾ line.

Ceylon.

ORMYRIDÆ.

Tribæus, *Foerst.*, and Monobæus, *Foerst.*, are two European genera of this family.

Genus ORMYRUS.

Of this genus there are several European and one North American species. Two species have been found in England. O. nigrocyaneus is merely a variety of O. punctiger.

O. ORIENTALIS. *Fœm.*—Cyaneo-viridis, purpureo et aureo-viridi varius; antennæ nigræ; scutellum acuminatum; abdomen longiconicum, fortiter punctatum; tarsi albidi; alæ diaphanæ.

Female.—Bluish green, partly purple or golden green, thinly beset with white hairs. Antennæ black, subclavate, nearly as long as the head and the thorax together. Scutellum acuminated. Abdomen elongate-conical, largely punctured, longer than the head and the thorax together. Legs green; hind femora blue; tarsi whitish. Wings pellucid; veins pale brown; ulna nearly as long as the humerus; radius less than one-fourth of the length of the ulna; cubitus extremely short. Length of the body 1¼ line.

Ceylon.

ENCYRTIDÆ.

The structure of the Encyrtidæ is very different from that of the preceding families. The large prothorax which characterizes the Leucospidæ, Chalcididæ, Eurytomidæ, Torymidæ and Perilampidæ ceases here, but the mesothorax is much developed, and there is a corresponding expansion of the mesopectus and of the middle legs, which enable the little flies to take long and rapid leaps. The short and sessile abdomen which distinguishes them is also adapted to their movements, which exceed in quickness those of all the other Chalcidiæ. They exercise a limitatory control over the Coccidæ, or scale-insects, on which they generally feed in early life, and the female Encyrtus may be often seen skipping about the female Coccus and inserting eggs therein. The structure of this family seems to

develope that of the Myinidæ and Trichogrammidæ; some of these latter vie with the Mymaridæ and the Teleadidæ in the excessive minuteness of their size. Many of the species of Encyrtidæ have been elaborated by Dalman, and Foerster has distributed them into genera, and his Synopsis of these genera is here translated.

A. Scutellum with an apical tuft of hair.
a. Ulna very long; cubitus and radius very short. - - - - - CHEILONEURUS.
b. Ulna very short; cubitus and radius very long. - - - - - EUCOMYS.
B. Scutellum with no apical tuft of hairs.
a. Vertex and face largely punctured.
* Scape extending to the height of the vertex. Ulna none or extremely short. - - BOTHRYOTHORAX.
** Scape not extending to the height of the vertex. Ulna of moderate length. - DISCODES.
b. Vertex and face not largely punctured.
* Scape and flagellum much dilated.
† Body wholly and very flat. No wings. - ANUSIA.
†† Body not wholly flat.
‡ Flagellum fusiform. Cubitus longer than the ulna. Radius distinctly formed. - EURYSCAPUS.
‡‡ Flagellum not fusiform. Cubitus not longer than the ulna. No radius. CERAPTEROCERUS.
** Scape and flagellum not much dilated.
† Mesothorax very small, almost transverse.
‡ Antennæ 10-jointed. - - - METALLON.
‡‡ Antennæ with more than 10 joints.
§ Head and thorax with the usual sculpture and punctures. Humeri contracted together. - CHOREIA.
§§ Head and thorax smooth, without punctures. Scutellum with two cavities at the base. Humeri not contracted together. - - AGLYPTUS.
†† Mesothorax not very small, not transverse.
‡ Antennæ 9-jointed. - - - CERCOBELUS.
‡‡ Antennæ with more than nine joints.
§ Abdomen with a distinct and very prominent oviduct.
× Flagellum filiform, very long. Abdomen much developed, sometimes contracted on the sides. - - - - COPIDOSOMA.
× × Flagellum not usually long. Abdomen not much developed, not contracted on the sides.

o Vertex very narrow. Lateral ocelli seated in the inner border of the eyes. Club of the antennæ obliquely acuminated. - - ECHTHROPLEXIS.

oo Vertex of the usual breadth. Lateral ocelli not seated in the border of the eyes. Club of the antennæ broadly rounded. - - CERCHYSIUS.

§§ Abdomen with no prominent oviduct.

× Ulna, radius and cubitus very long.

o Joints of the flagellum short, with incumbent hairs, very thickly crowded together in both sexes. - - - - ERICYDNUS.

oo Joints of the flagellum distinctly separate, with long whorls of hairs in the male. - STERRHOCOMA.

× × Ulna, radius and cubitus not very long.

o Humeri widely separated. - - - DINOCARSIS.

oo Humeri not widely separated.

-+- Body flat, not metallic-coloured. Front and vertex connected by a slight arch. - RHOPUS.

-+-+- Body metallic-coloured, not flat. Front and vertex separated by a more or less sharp curve.

-+- Flagellum unusually long and slender. - LEPTOMASTIX.

-+-+-+- Flagellum not unusually long and slender.

ᔕ Neck and tip of the scutellum with laminate scales. - - - - - - HABROLEPIS.

ᔕᔕ Neck and tip of the scutellum with no laminate scales.

Λ Last joint of the flagellum longer than all the preceding joints together. - - SCEPTROPHORUS.

ΛΛ Last joint of the flagellum shorter than all the preceding joints together. - - ENCYRTUS.

NOTES

ON

CHALCIDIÆ.

PART V.

ENCYRTIDÆ, MYINIDÆ, EUPELMIDÆ,
CLEONYMIDÆ, SPALANGIDÆ, PIRENIDÆ.

BY

FRANCIS WALKER, F.L.S.

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1872.

LONDON:

E. NEWMAN, PRINTER, DEVONSHIRE STREET,

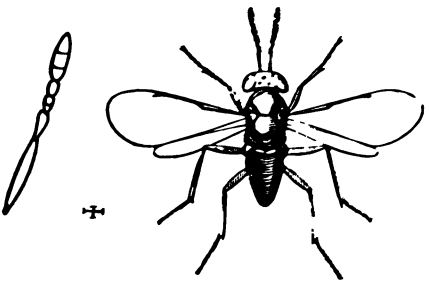
BISHOPSGATE.

NOTES ON CHALCIDIÆ.

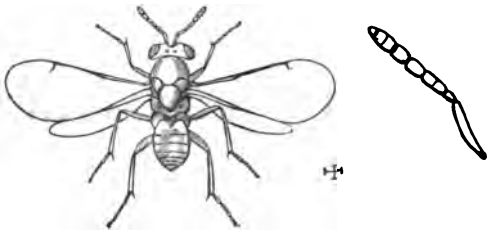
PART V.

ENCYRTIDÆ (*continued*).

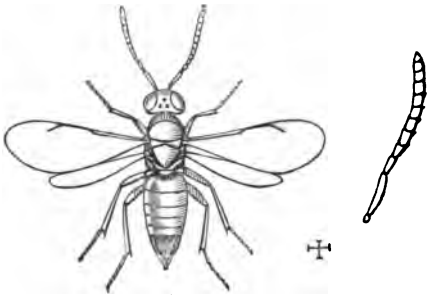
Ormyrus punctiger.



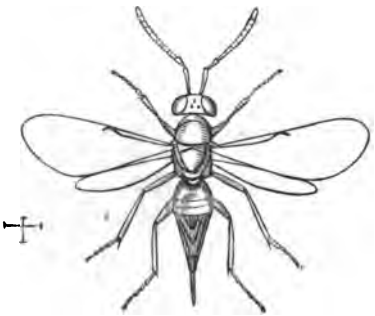
Aphelinus basalis.



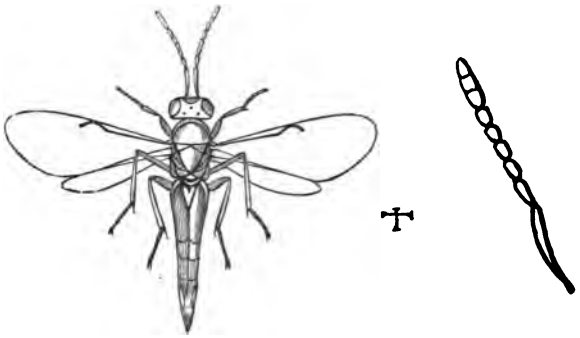
Coccophagus scutellaris.



Ericydnus strigosus.

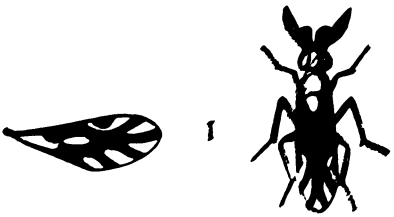


Cerchysius urocerus.

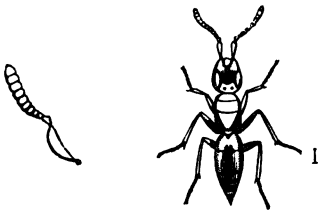


Cercobelus jugæus.

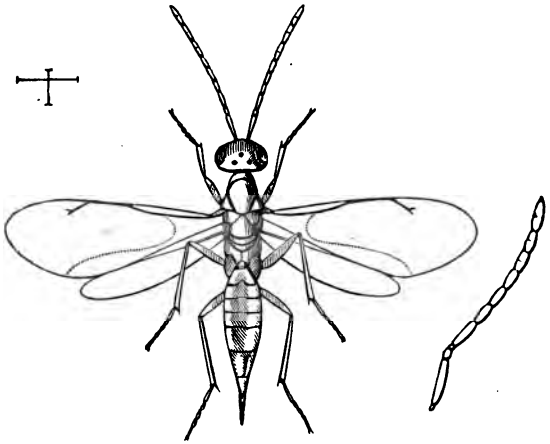
Encyrtus corniger.



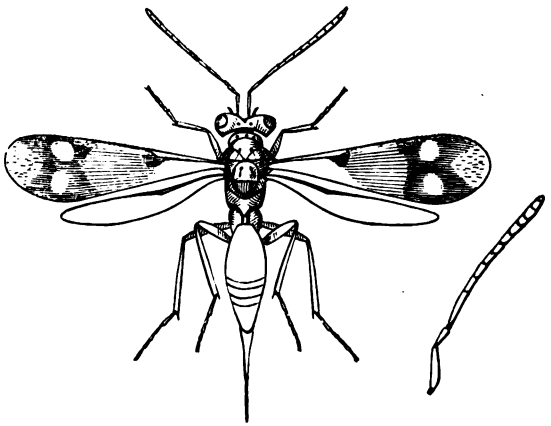
Ceraptenocerus mirabilis.



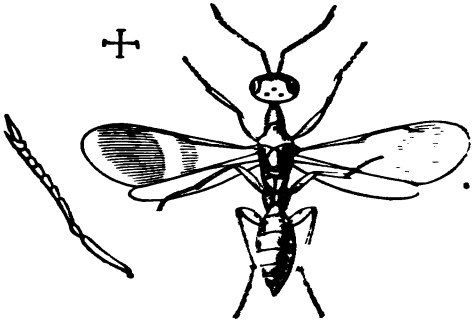
Ectroma fulvescens.



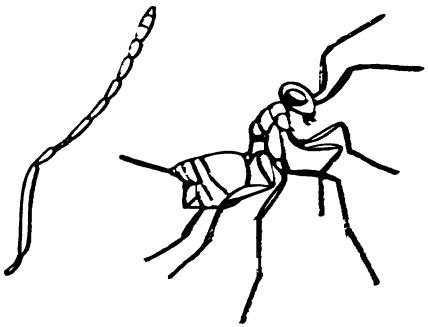
Trigonoderus obscurus.



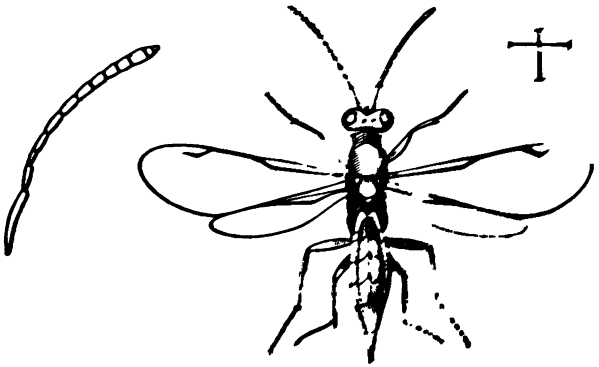
Lelaps Sadales.



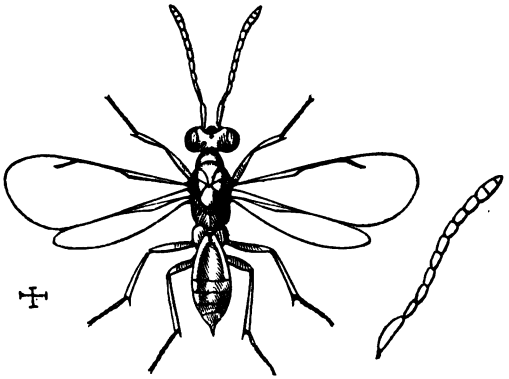
Notanisus versicolor.



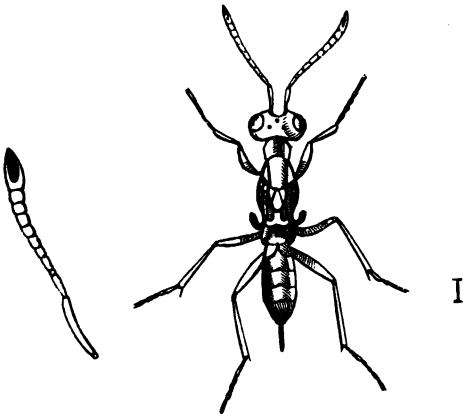
Cea pulicaria.



Caloster vernalis.



Eupelmus urozonus.



Eupelmus Degeeri.

The preceding figures represent some of the genera of Encyrtidæ and of the allied families, and, like others before mentioned, are copied from the drawings of the late A. H. Haliday. Copies of these drawings appeared in the 'Entomologist,' edited by E. Newman, to whom I had offered them for publication. In page 2 of these notes the very stout apical spine of the middle tibiæ, which is characteristic of the Encyrtidæ

and of the Eupelmidæ, is accidentally printed as "a very short apical spine." In page 3 Eutedonidæ should be Entedonidæ, and in page 60 Orctilia is a misprint for Oretilia.

The affinity of the Encyrtidæ to the Myinidæ in structure has been already mentioned; they are parasites of various insects; many of them are maintained in the bodies of Coccus-species. Some of the Myinidæ also feed on Cocci, and one species, Aphelinus tibialis, is the devourer of Aphis Urticaria, on the bramble, where this Aphis is more frequently the prey of an Allotria and much more often of an Aphidius, all the victims being very few when compared to the numbers which are soon afterwards removed by atmospheric agency.

The typical species of most of the genera of Encyrtidæ are as follows:—

CHEILONEURUS, *Westw.*

Example Encyrtus elegans, *Dalm.*

COMYS, *Foerst.*

Ex. Encyrtus scutellaris, *Dalm.* E. obscurus, *Dalm.* E. Swedori, *Dalm.* E. morio, *Dalm.*

BOTHRYOTHORAX, *Ratz.*

Ex. Encyrtus clavicornis, *Dalm.* E. Eupales, *Wlk.* E. Arceanus, *Wlk.*

DISCODES, *Foerst.*

Ex. Encyrtus æneus, *Dalm.* E. melanopterus, *Nees.*

EURYSCAPUS, *Foerst.*

Ex. Encyrtus platycerus, *Dalm.*

CERAPTEROCERUS, *Westw.*

Ex. mirabilis, *Westw.*

METALLON, *Wlk.*

Ex. Acacallis, *Wlk.*

CHOREIA, *Westw.*

Ex. Encyrtus ineptus, *Dalm.*

AGLYPTUS, *Foerst.*

Ex. Encyrtus Lindus, *Wlk.*

CERCOBELUS, *Hal.*

Ex. Encyrtus Jugæus, *Wlk.* Prof. Foerster suggests that this genus and Copidosoma are identical.

COPIDOSOMA, *Ratz.*

Ex. C. Boucheanum, *Ratz.*

CERCHYSIUS, *Westw.*

Ex. Encyrtus urocerus, *Dalm.*

ERICYDNUS, *Hal.*

Ex. Encyrtus strigosus, *Nees.* E. paludatus, *Hal.*

STERRHOCOMA, *Foerst.*

Ex. histrio, *Foerst.*

DINOCARSIS, *Foerst.*

Ex. Encyrtus hemipterus, *Dalm.*

RHOPUS, *Foerst.*

Ex. Encyrtus Piso, *Wlk.*

HABROLEPIS, *Foerst.*

Ex. Encyrtus nubilipennis, *Wlk.* E. Zetterstedtii, *Westw.*

SCEPTROPHORUS, *Foerst.*

Ex. Encyrtus paradoxus, *Dalm.* S. anomalus, *Foerst.*

ENCYRTUS, *Dalm.*

The genera before mentioned have very few representatives, but the species that remain in Encyrtus are very numerous, and a Synopsis of them is deferred. In them and in the literature relative to them there is a wide field for investigation, and they include several groups, which differ as much from each other as they do from the genera already separated from Encyrtus.

ECTROMA, *Dalm.*

Ex. fulvescens, *Westw.* This genus is not included by Prof. Foerster in his Synopsis.

ENCYRTUS AREOLATUS. *Fœm.*—Viridi-niger, crassus; antennæ nigræ, subclavatæ, thorace longiores, articulo 1o luteo, clava sublanceolata; thorax fortiter punctatus; abdomen cupreo-nigrum; pedes nigri, tibiis basi tarsisque luteis; alæ diaphanæ, testaceo venosæ, cubito piceo.

Female. Greenish black, very stout. Head hardly broader than the thorax. Antennæ black, subclavate, rather slender, longer than the thorax; first joint luteous: club sublanceolate, more than twice the length of the preceding joint, which it hardly exceeds in breadth. Thorax largely punctured. Abdomen cupreous-black, smooth, shining, depressed above, nearly triangular, a little shorter than the thorax which it equals in breadth at its base. Legs black; tibiæ towards the tips and tarsi luteous. Wings pellucid; veins testaceous; cubitus piceous, curved, longer than the radius. Length of the body $\frac{4}{5}$ line.

The thorax is more finely punctured than that of E. clavicornis. Bothryothorax may be reunited to Encyrtus, the characters on which it is founded being too slight for those of a separate genus.

Corsica. In the collection of the Rev. T. A. Marshall.

Fam. 7. MYINIDÆ.

A. Fore wings with some hairless lines.
a. Three last joints of the antennæ very unlike in size. - - - - - MYINA.
b. Three last joints of the antennæ equal in size. - - - - - MESIDIA.
B. Fore wings equally hairy. - - - COCCOPHAGUS.

Prof. Foerster, whose Synopsis of the Myinidæ is here translated, does not there mention any example of his genus Mesidia; the other two genera were previously published, and Myina is a synonym of Aphelinus.

Fam 8. EUPELMIDÆ.

The European genera of this family and of the Cleonymidæ are distinguished by Prof. Foerster as follows:

A. Hind tibiæ and hind tarsi contracted, broad. - HALIDEA.
B. Hind tibiæ and hind tarsi not contracted, nor broad.
a. Front ridged near the insertion of the antennæ.
* Middle tibiæ much elongated.
† Antennæ inserted near the border of the mouth. STENOCERA.
†† Antennæ not inserted near the border of the mouth. - - - - - POLYMORIA.

** Middle tibiæ not elongated. - - - EUSANDALUM.
b. Front not ridged near the insertion of the antennæ.
* Scutellum with a somewhat broad base. - CALOSOTER.
** Scutellum with a very narrow base.
† Middle tarsi with stout bristles beneath. - EUPELMUS.
†† Middle tarsi without stout bristles beneath. - CHARITOPUS.

Halidea and Metapelma are perhaps one genus.

Fam. 9. CLEONYMIDÆ.

A. Wingless.
a. Oviduct not prominent. - - - TRICORYPHUS.
b. Oviduct very prominent. - - CEA.
B. Winged.
a. Fore femora much incrassated. - - HEYDENIA.
b. Fore femora not incrassated.
* Antennæ with whorls of hairs. - - PLUTOTHRIX.
** Antennæ without whorls of hairs.
† Second abdominal segment with a transverse impression. - - - TETRACAMPE.
†† Second abdominal segment with no transverse impression.
‡ Scutellum with a deep transverse furrow near the tip.
§ Sutures of the parapsides distinct throughout. - - - - - TRIGONODERUS.
§§ Sutures of the parapsides indistinct. - CAUDONIA.
‡‡ Scutellum with no transverse furrow near the tip.
§ Middle tibiæ and middle tarsi incrassated. - PROSOPON.
§§ Middle tibiæ and middle tarsi not incrassated.
× Costa of the fore wings with a thickening at the base. - - - - PLATYNOCHEILUS.
× × Costa of the fore wings not thickened at the base.
o Club of the antennæ obliquely truncated on the under side. - - - NOTANISUS.
oo Club of the antennæ not obliquely truncated.
+ Antennæ 12-jointed. - - - CLEONYMUS.
+ + Antennæ 13-jointed. - - - MEROSTENUS.

One species of Cea is winged, and Tetracampe does not belong to this family; perhaps Platynocheilus should be removed from it, and Notanisus is more nearly allied to the Eupelmidæ than to some of the genera with which it is here associated.

There does not seem to be any near affinity between the Eupelmidæ and the Encyrtidæ, notwithstanding their mutual resemblance in the structure of the middle legs. There is a transition from the Pteromalidæ to the Cleonymidæ: the former family includes a vast number of species of small size and of slightly varying structure: in the Cleonymidæ, on the contrary, there are several exotic species of large size and of remarkable form, some with incrassated fore legs, others with incrassated hind legs, like the Chalcididæ, and others have a long oviduct like the Torymidæ and the Agaonidæ.

These exotic forms include the following genera: Lycisca, Epistenia, Prionopelma, Lelaps, Agamerion, Chalcodectus, Myrmecopsis, Cleptimorpha.

EUPELMUS SUBNUBILUS. *Fœm.*—Corpus gracile. Frons valde excavata. Antennæ graciles, subclavatæ, thorace longiores, prope os insertæ. Thorax antice depressus. Abdomen fusiforme, depressum, subsessile, thorace paullo angustius et longius. Pedes graciles, longiusculi; tibiæ intermediæ articulis 1o et 2o subdilatatis. Alæ breviusculæ, sat angustæ.

Female.—Body slender. Head and prothorax finely squamous. Head a little broader than the thorax; front much excavated. Eyes large. Antennæ slender, subclavate, longer than the thorax, inserted near the mouth. Fore part of the thorax depressed. Abdomen fusiform, depressed, subsessile, a little narrower and longer than the thorax. Legs slender, rather long; middle tibiæ with a long apical spur; first and second joints of middle tarsi slightly dilated. Fore wings rather short and narrow; ulna much shorter than the humerus; radius much shorter than the ulna; cubitus long, slightly curved, much shorter than the radius; stigma very small.

Fœm. Cupreus; antennæ nigræ; pedes fulvi, tibiis basi femoribusque piceis; alæ anticæ cinereæ, plaga discali magna fuscescente.

Female. Cupreous. Eyes and antennæ black. Legs tawny; femora mostly piceous; tibiæ slightly piceous towards the base. Wings cinereous: veins tawny. Fore wings with a large brownish diffuse patch in the disk. Length of the body $1\frac{1}{3}$ line.

Corsica. In the collection of the Rev. T. A. Marshall.

EUPELMUS PEZOMACHOIDES. *Mas.*—Corpus gracile, fere lineare. Antennæ graciles, subclavatæ, thoraci æquilongæ, prope os insertæ; articulus 1us longus, gracilis, subarcuatus. Thorax antice depressus et coarctatus. Abdomen sessile, depressum, thoraci æquilongum, postice latescens. Pedes longi, graciles. Alæ breviusculæ, sat angustæ.

Fœm.—Antennæ fere lineares, thorace multo longiores. Oviductus abdomine multo brevior. Pedes intermedii longissimi. Tarsi postici basi dilatati. Alæ anticæ perangustæ, thorace paullo longiores.

Male.—Body slender, nearly linear. Head and thorax very finely squamous. Head as broad as the thorax. Eyes large. Antennæ slender, subclavate, apparently 9-jointed, as long as the thorax, inserted near the base of the front; first joint long, slender, slightly curved. Thorax depressed and narrowed in front. Abdomen sessile, depressed, increasing in breadth from the base to the tip, as long as the thorax. Legs long, slender. Wings rather short and narrow; ulna a little longer than the humerus; radius much shorter than the ulna; cubitus moderately long.

Female.—Antennæ nearly linear, much longer than the thorax. Abdomen fusiform, a little longer than the thorax. Sheaths of the oviduct much shorter than the abdomen. Middle legs very long. First joint of the hind tarsi much dilated; second slightly dilated. Fore wings very narrow, a little longer than the thorax.

Mas.—Cupreus; frons viridis; antennæ nigræ, articulo 1o luteo; mesothoracis latera viridia; abdomen basi album; pedes nigri, tibiis basi tarsisque pallide flavis; alæ anticæ fasciis duabus latis nigricantibus fasciaque intermedia tenui alba.

Fœm.—Antennæ omnino nigræ; thorax totus cupreus; tarsi antici lutei; tarsi quatuor posteriores albi; alæ anticæ albæ, fasciis duabus latis nigris, 2o apicali.

Male.—Cupreous. Front bright green. Antennæ black; first joint luteous, Thorax bright green on each side near the base of the fore wings. Abdomen white towards the base. Legs black; tibiæ at the base and tarsi pale yellow. Wings pellucid. Fore wings with two broad blackish bands, between which there is a narrow inward-curved white band; veins tawny. Length of the body $1\frac{1}{6}$ line.

Female.—Cupreous. Antennæ wholly black. Thorax wholly cupreous. Abdomen white towards the base. Sheaths of the oviduct black. Legs black; fore tarsi luteous; four posterior tarsi white. Wings white. Fore wings with two broad black bands; second band apical. Length of the body $1\frac{2}{3}$ line.

Corsica. In the collection of the Rev. T. A. Marshall.

EUPELMUS SUBVITTATUS. *Fœm.*—Corpus gracile. Caput magnum, thorace latius. Antennæ graciles, subclavatæ, thoraci æquilongæ. Parapsidium suturæ approximatæ, bene determinatæ. Abdomen sessile, lanceolatum, depressum, apice subcompressum. Oviductus abdomine paullo brevior. Pedes longi, graciles; tarsi intermedii breves, subdilatati. Alæ angustæ.

Female.—Body slender. Head and thorax finely squamous. Head large, broader than the thorax. Antennæ slender, subclavate, as long as the thorax, inserted near the month. Thorax elongate. Prothorax well developed, narrower in front. Sutures of the parapsides distinct, approximate. Abdomen wholly sessile, lanceolate, depressed, slightly compressed at the tip. Sheaths of the oviduct stout, a little shorter than the abdomen. Legs long, slender; middle tibiæ with a stout apical spur; middle tarsi short, slightly dilated. Fore wings narrow; ulna almost as long as the humerus; radius full half the length of the ulna; cubitus long; stigma small.

Fœm.—Cupreus; antennæ nigræ; mesothoracis latera viridia; abdomen basi et apice testaceo univittatum; pedes fulvi, femoribus anticis piceo latissime unifasciatis, tibiis anticis basi extus piceis, femoribus tibiisque intermediis piceo subnotatis; alæ cinereæ.

Female.—Cupreous. Antennæ and sheaths of the oviduct black. Mesothorax bright green on each side. Abdomen with a testaceous stripe near the base and near the tip. Legs tawny; fore femora with a very broad piceous band; fore tibiæ piceous on the outer side towards the base; middle femora and middle tibiæ slightly marked with piceous. Fore wings cinereous; veins testaceous. Length of the body 1⅔ line.

South France. In the collection of the Rev. T. A. Marshall.

EUPELMUS LEITHI. *Mas.*—Purpureus; antennæ nigræ, subclavatæ, thorace paullo breviores, articulo 1o luteo; thoracis discus viridis; abdomen nigricans, basi lutescens; pedes picei, genubus tarsisque fulvis: alæ anticæ fuscæ, basi apiceque cinereæ, fascia media arcuata alba.

Male.—Purple. Antennæ black, subclavate, a little shorter than the thorax; first joint luteous. Prothorax attenuated in front. Disk of the mesothorax flat, bright green. Abdomen blackish, lutescent towards the base. Legs piceous; knees and tarsi tawny. Fore wings brown, cinereous at the base and at the tips, with a white inward-curved band across the middle of the brown part. Hind wings pellucid. Length of the body 2 lines.

Reared in October at Bombay by Dr. Leith, from blisters on the parenchyma at the edges of a leaf of Duranta; it emerged from a hole in the middle of the blister, which was probably formed by the grub of a dipterous or of a microlepidepterous insect. Its near relations are widely spread, for it is closely allied to Antigaster mirabilis of North America (the 'American Entomologist' ii. 369, f. 9a), to Eupelmus bifasciatus of South Europe, and to Calosoter bifasciatus of China. The name of the last species may be changed to Eupelmus fascipennis; it appears also in Borneo. Notanisus versicolor is allied to this group, and especially to E. Leithi.

The genus Chirolophus of Haliday is distinguished from the other Eupelmidæ by the flabellate antennæ of the male.

PRIONOPELMA LONGIFICA. *Fœm.*—Cyaneo-viridis: antennæ nigræ, fere filiformes, thorace paullo longiores, articulo 1o cyaneo-viridi; thorax purpureo varius, lateribus rufis, metathorace scabro; abdomen lanceolatum, subsessile, subcompressum, thorace longius, basi cupreo varium; oviductus corpore triplo longior; pedes rufi; alæ anticæ cinereæ, fuscescente substrigatæ.

Female.—Bright bluish green, with cinereous pubescence. Eyes piceous. Antennæ black, nearly filiform, a little longer than the thorax; first joint bluish green. Thorax finely squamous, partly purple; sides smooth, red. Prothorax short. Sutures of the parapsides strongly marked. Metathorax elongated, scabrous. Abdomen lanceolate, smooth, subsessile, slightly compressed, longer than the thorax, partly cupreous towards the base. Oviduct and its sheath black, thrice the length of the body. Legs red; middle tibiæ with a thick apical spine; middle tarsi slightly dilated, except towards the tips. Wings cinereous; veins black. Fore wings with a very slight and diffuse brownish streak; humerus much longer than the ulna; radius a little longer than the ulna; cubitus about one-fifth of the length of the ulna; stigma very small. Length of the body 4 lines; of the oviduct 12 lines.

Most allied to P. longicollis; the thorax is shorter and the wings are a little shorter.

Amazon Region.

Genus CLEPTIMORPHA.

Mas.—Corpus sat gracile, fere lineare. Caput thorace paullo latius. Antennæ graciles, filiformes, apud os insertæ, thorace non breviores. Prothorax transversus, subquadratus, bene determinatus. Mesothorax fere planus; parapsidum suturæ indistinctæ; scutellum

parvum, fere rotundum. Metathorax magnus, postice angustior. Abdomen clavatum, planum, subsessile, thorace paullo longius. Coxæ posticæ longissimæ. Femora postica valde incrassata, subtus tridentata. Tibiæ posticæ arcuatæ, subclavatæ. Tarsi intermedii basi subincrassati. Alæ latæ.

Male.—Body rather slender, nearly linear. Head and thorax convex, finely squamous. Head a little broader than the thorax. Antennæ slender, filiform, compact, inserted near the mouth, full as long as the thorax; first joint long, slender; second elongate-cyathiform; the others linear, closely fitted together; tips mutilated in the specimen described. Prothorax subquadrate, transverse, well-developed. Mesothorax nearly flat; sutures of the parapsides indistinct; scutellum small, nearly round. Metathorax much developed, decreasing in breadth from the base to the abdomen. Abdomen flat, subsessile, clavate, smooth, shining, a little longer than the thorax. Hind coxæ very long; hind femora much incrassated, armed beneath with three long stout teeth, of which the third and subapical one is double; hind tibiæ curved, subclavate; middle tarsi slightly incrassated towards the base. Wings ample; ulna as long as the humerus; radius and cubitus moderately long.

This genus is one of the Cleonymidæ; it resembles the Chalcididæ in the structure of the hind legs.

C. BINOTATA. *Mas.*—Cyaneo-viridis; antennæ nigræ, articulo 1o testaceo; abdomen basi plagaque discali testaceis; pedes testacei, coxis posticis cyaneo-viridibus apice testaceis, femoribus posticis ex parte nigricantibus, tibiis intermediis nigris, tarsis quatuor posterioribus basi nigris; alæ diaphanæ, testaceo venosæ.

Male.—Bluish green. Antennæ black; first joint testaceous. Abdomen testaceous at the base and with a large testaceous patch in the disk. Legs testaceous; hind coxæ bluish green, testaceous towards the tips; hind femora partly blackish; middle tibiæ black; four posterior tarsi black towards the base. Wings pellucid; veins testaceous. Length of the body 1⅔ line.

Madeira.

TRIGONODERUS CONTRACTUS. *Fœm.*—Viridis; antennæ nigræ, subclavatæ, thorace vix longiores, articulo 1o flavo basi apiceque viridi; abdomen cupreum, lanceolatum, depressum, thorace multo longius; pedes flavi, femoribus tibiisque anticis ex parte fuscescentibus; alæ diaphanæ, venis pallide testaceis.

Female.—Bright green. Head and thorax finely squamous. Head a little broader than the thorax. Antennæ black, subclavate, hardly

longer than the thorax; first joint yellow, green at the base and at the tip; club elongate-elliptical, much broader than the preceding joint and more than twice its length. Abdomen smooth, cupreous, lanceolate, depressed, very much longer than the thorax. Legs yellow; fore femora and fore tibiæ brownish, except at the base and at the tip. Wings pellucid; veins pale testaceous; ulna very much shorter than the humerus; radius rather shorter than the ulna; cubitus long, less than half the length of the radius. Length of the body 3 lines.

The longer abdomen distinguishes it from all the other described species of the genus.

England. In the collection of Dr. Chapman.

Note.—Pteromalus abnormis (Boheman, Ofv. K. V. Akad. Förh. 1859, 59, pl. 2, f. 3) perhaps belongs to the Agaonidæ. It was reared by Boheman in Lapland, from a pupa, perhaps of Sarcophaga, in the nest of a swallow. The male has incomplete wings.

EUPELMUS TENUICOLLIS. *Fœm.*—Corpus gracile, longum. Caput thorace latius. Oculi magni. Antennæ graciles, fere filiformes, thorace paullo longiores. Thorax subquadratus, antice attenuatus. Abdomen longi-fusiforme, depressum, subsessile, thorace paullo brevius. Pedes graciles; femora antica valde incrassata. Alæ anticæ sat angustæ.

Female.—Body slender, elongated. Head and thorax very finely squamous. Head broader than the thorax, attached to the prothorax by a very slender neck. Antennæ slender, compact, nearly filiform, a little longer than the thorax; joints elongated. Thorax slightly compressed. Prothorax elongate-subquadrate. Mesothorax and metathorax much like those of Metapelma in structure. Abdomen elongate-fusiform, depressed, subsessile, a little shorter than the thorax. Legs slender; fore femora much incrassated; middle tibiæ with a long apical spine; middle tarsi slightly incrassated. Fore wings rather narrow; ulna about half the length of the humerus; radius about as long as the ulna; cubitus rather short; stigma moderately large.

Fœm.—Viridis; antennæ nigræ; pedes virides, femoribus quatuor posterioribus basi tibiis quatuor posterioribus tarsisque ferrugineis; alæ cinereæ.

Female.—Metallic-green. Antennæ black. Eyes piceous. Four posterior femora towards the base and four posterior tibiæ and tarsi

ferruginous. Wings cinereous; veins black. Length of the body 3 lines.

Mysol.

EPISTENIA NIGRA. *Fœm.*—Nigra; caput thoraee paullo latius; antennæ subclavatæ, thorace paullo breviores; prothorax brevis, subquadratus; parapsidum suturæ valde determinatæ; metathorax brevis; abdomen convexum, sessile, thorace fere quadruplo longius, dimidio apicali compresso stylato; pedes breviusculi, sat graciles, tibiis tarsisque piceis basi sordide albidis; alæ cinereæ.

Male.—Black, with slight cinereous tomentum. Head and thorax very finely squamous. Head a little broader than the thorax. Antennæ subclavate, compact, a little shorter than the thorax. Prothorax short, subquadrate. Mesothorax with the sutures of the parapsides strongly marked. Metathorax short. Abdomen convex, quite sessile, nearly four times the length of the thorax, its hinder half forming a compressed style. Legs rather short and slender; tibiæ and tarsi piceous, dingy whitish towards the base. Wings cinereous; veins black; ulna about half the length of the humerus, a little longer than the radius; cubitus very short; stigma very small. Length of the body 5 lines.

Zulu.

EPISTENIA QUADRIPLAGIATA. *Fœm.*—Cyaneo-viridis; caput thoraci æquilatum; antennæ nigræ, subclavatæ, thorace vix breviores, articulo 1o viridi; prothorax brevis, subquadratus; parapsidum suturæ valde determinatæ; metathorax brevissimus; abdomen convexum, lanceolatum, sessile, peracutum, basi cupreum, thorace multo longius; pedes rufi, sat graciles; alæ anticæ cinereæ, plagis duabus fuscescentibus connexis.

Female.—Bluish green, slightly pubescent. Head and thorax finely squamous. Head as broad as the thorax. Eyes piceous. Antennæ black, subclavate, compact, nearly as long as the thorax; first joint green. Prothorax short, subquadrate. Mesothorax with the sutures of the parapsides strongly marked. Metathorax very short. Abdomen sessile, lanceolate, convex, smooth, very acute, bright cupreous above at the base, much longer than the thorax. Legs red, rather slender; middle tibiæ with a long apical spine. Wings cinereous; two brownish patches, which are connected with each other and with the costa on each fore wing; veins black; ulna much more than half the length of the humerus; radius as long as the ulna; cubitus rather short; stigma very small. Length of the body 3½ lines.

Amazon Region.

Fam. 10. SPALANGIDÆ.

A. Antennæ inserted close to the mouth. - SPALANGIA.
B. Antennæ inserted far from the border of the mouth. - - - - CEROCEPHALA.

Spalangia nigra inhabits the Galapagos as well as Europe, and never appears in abundance, though it is a parasite of Musca domestica. The wingless female of Cerocephala cornigera is sometimes seen crawling on paper; it occurs rarely; it has been found near London, in the North of England, in North Devon and in Killarney.

Fam. 11. PIRENIDÆ.

A. Maxillary palpi 4-jointed.
a. Eyes of the male approximate. - - MACROGLENES.
b. Eyes wide apart in both sexes. - - CALYPSO.
B. Maxillary palpi 2-jointed. - - - PIRENE.

Prof. Foerster proposes the name Euryophrys instead of Calypso, the latter name having been used previously for a genus of plants.

The insects of this family are few in species and comparatively scarce in individuals. They have not a near affinity to the Spalangidæ, nor to the Hormoceridæ, and are as yet isolated from every other family of the tribe.

NOTES

ON

CHALCIDIÆ.

PART VI.

HORMOCERIDÆ, SPHEGIGASTERIDÆ, PTEROMALIDÆ, ELASMIDÆ, ELACHISTIDÆ, EULOPHIDÆ, ENTEDONIDÆ, TETRASTICHIDÆ, TRICHOGRAMMIDÆ.

BY

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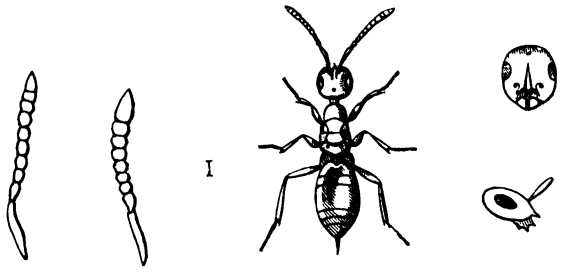
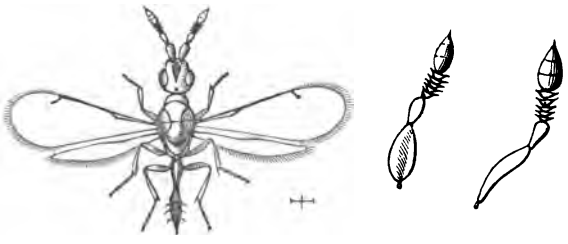
NOTES ON CHALCIDIÆ.

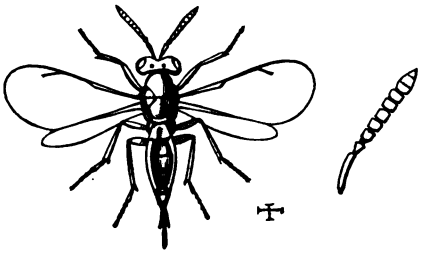
PART VI.



Cerocephala formiciformis.



Pirene varicornis.



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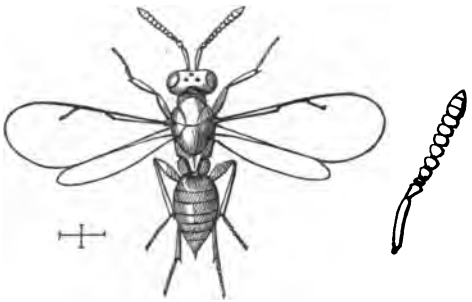
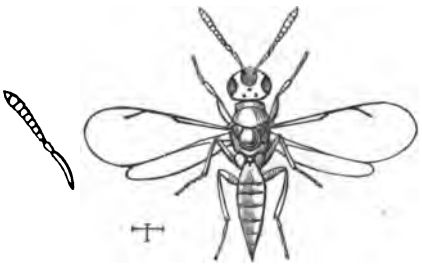
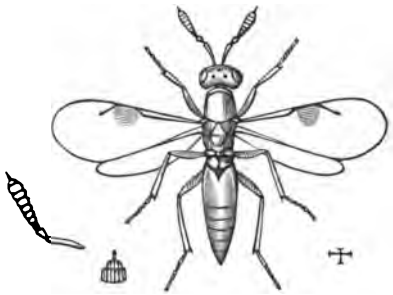


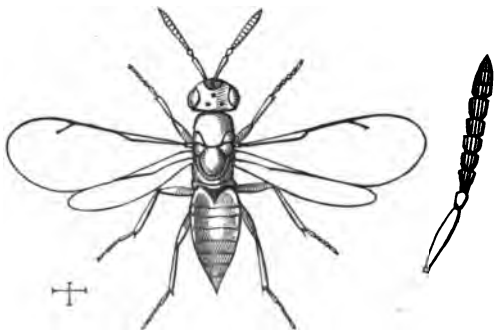
Hormocerus maritimus.



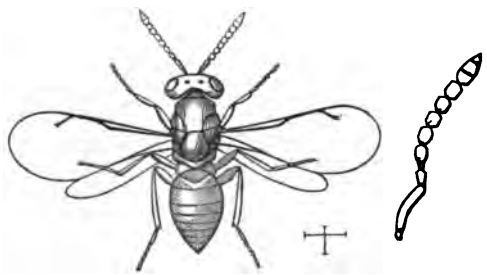
Psilonotus adamas.



Rhaphitelus maculatus.



Scmiotus varians.



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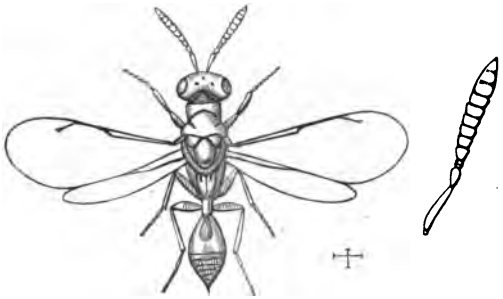
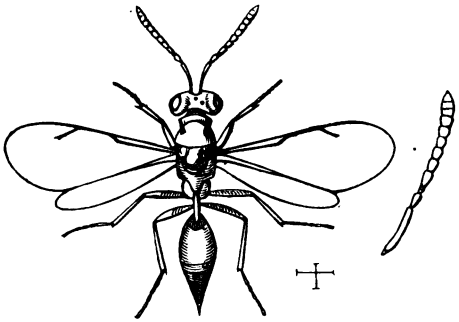
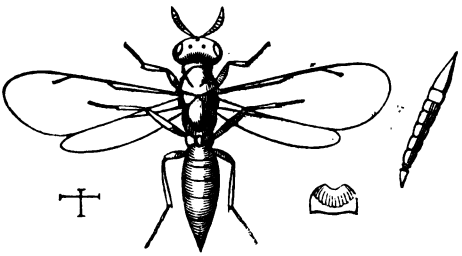


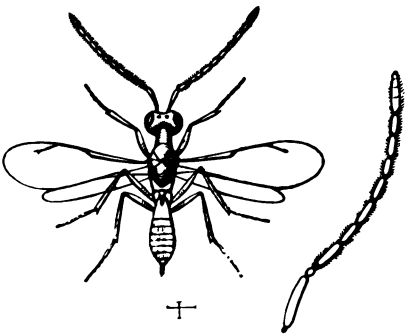
Syntomopus thoracicus.



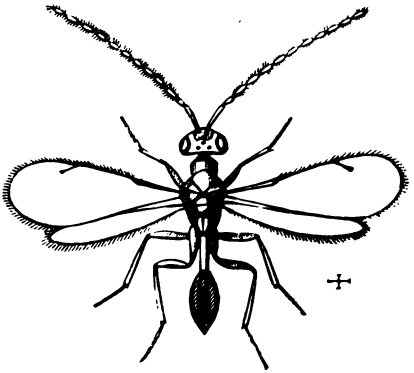
Sphegigaster flavicornis.



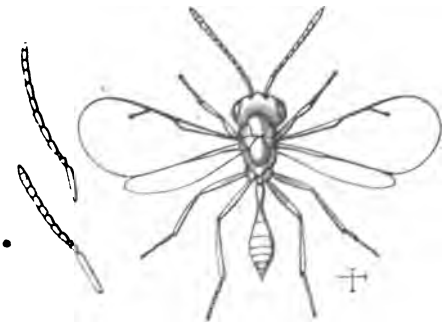
Merisus splendidus.



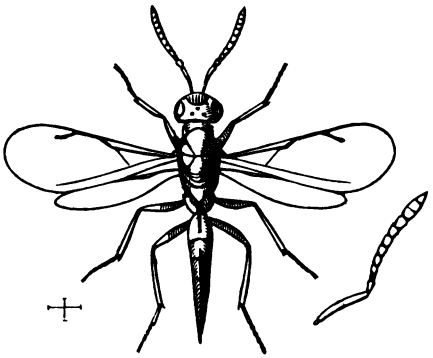
Merostenus Phedyma.



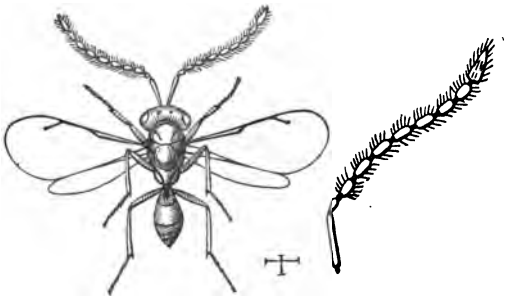
Dipara petiolata.



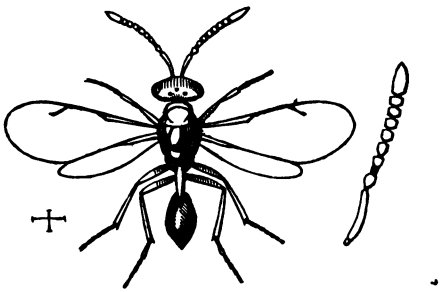
Coryna clavata.



Toxeuma Ericæ.



Psilocera obscura.



Prosodes ater.

Metopon atrum.

Fam. 12. HORMOCERIDÆ.

A. Abdomen not compressed.
a. Antennæ 13-jointed.
* Parapsides strongly marked. - - HORMOCERUS.
** Parapsides not strongly marked.
† Antennæ with two ringlets in both sexes. Oviduct not prominent. - - UROLEPIS.
†† Antennæ of the male with three ringlets, of the female with two ringlets. Oviduct somewhat prominent. - - - ANOGMUS.
b. Antennæ 12-jointed.
* Antennæ with three ringlets. - - MICRADELUS.
** Antennæ with one ringlet. - - - TRIPEDIAS.
B. Abdomen compressed.
a. Thorax flat.
* Antennæ 12-jointed. Parapsides not well defined. - - - - - PSILONOTUS.
** Antennæ 13-jointed. Parapsides well defined. ISOPLATA.
b. Thorax convex.
* Antennæ with stylate tips. - - - RHAPHITELUS.
** Antennæ without stylate tips.
† Club of the antennæ shorter than the two preceding joints. - . - - MEROMALUS.
†† Club of the antennæ as long as the two preceding joints, or longer. - - - GASTRANCISTRUS.

Prof. Foerster observes that Miscogaster Stygne is the male of Urolepis maritimus, and that Pteromalus salinus, *Von Heyden*, a parasite of Cœnia halophila, is a second species of Urolepis. Anogmus has been reared from fir-cones, which are inhabited by Tortrix strobilana. The above author remarks that he has two species of

Tripedias, one of which is a parasite of Cecidomyia tenebricosa and of C. Tremulæ. He mentions a species of Psilonotus, which he names P. Catuli, and says that it has much resemblance to P. Hortensia. He changes the name Raphitelus to Raphidotelus, and observes that it is Stylocerus of Ratzeburg, which that author alters to Storthygocerus. R. maculatus is a parasite of Hylesinus Spartii, and R. Ladenbergii, *Ratz.*, of H. Fraxini.

HORMOCERUS IMPLETUS. *Fœm.*—Læte viridis, crassus; antennæ nigræ, subclavatæ, thoraci æquilongæ; abdomen ovatum, subsessile, cupreo varium, thoraci æquilongum; pedes nigri, genubus fulvis, tibiis apice tarsisque albidis; alæ diaphanæ.

Female.—Bright green, very stout. Head and thorax finely squamous. Head as broad as the thorax. Antennæ black, subclavate, as long as the thorax. Thorax very convex. Prothorax very short. Sutures of the parapsides distinct. Metathorax short. Abdomen subsessile, oval, very finely squamous, partly cupreous, as long as the thorax. Legs black; knees tawny; tarsi and tips of tibiæ whitish. Wings pellucid; veins tawny; ulna a little more than half the length of the humerus; radius much shorter than the ulna; cubitus much shorter than the radius. Length of the body 1 line.

It resembles H. Sabbas, but is much stouter.

Corsica. In the collection of the Rev. T. A. Marshall.

Fam. 13. SPHEGIGASTERIDÆ.

A. Head unusually developed; front with two sharply defined edges between the eyes. — CARATOMUS.
B. Head not unusually developed.
a. Ulna of the fore wings unusually long, occupying the greater part of the fore border. - - - - — DIPARA.
b. Ulna of the fore wings not unusually long.
* Ulna much incrassated.
† Mesothorax with two deep furrows. - — PACHYCREPIS.
†† Mesothorax with no deep furrows.
‡ Abdomen flat above or compressed. - — PACHYNEURON.
‡‡ Abdomen convex above.
§ Sixth abdominal segment (the petiole being reckoned as the first) as long as the fifth; seventh and eighth very small in the female. - - - - — EUNEURA.

§§ Sixth abdominal segment hardly one-third or hardly half the length of the fifth; seventh very small; eighth not visible (perhaps wholly wanting). - - HYPSICAMARA.

** Ulna not incrassated.

† Apical joint of the maxillary palpi much incrassated in the male, clavate or spatulate.

‡ Third abdominal segment not or hardly shorter than the second. - - CYRTOGASTER.

‡‡ Third abdominal segment much shorter than the second.

§ Stigma much incrassated. - - - SPHÆRIPALPUS.

§§ Stigma not incrassated. - - - PACHYLARTHRUS.

†† Apical joint of the maxillary palpi not incrassated.

‡ Middle tibiæ clavate. - - - SPANIOPUS.

‡‡ Middle tibiæ not clavate.

§ Prothorax subquadrate. - - - SYNTOMOPUS.

§§ Prothorax rounded in front.

× Antennæ with long hairs.

o Antennæ 12-jointed, with one ringlet; club not jointed. - - - ARTHROLYSIS.

oo Antennæ 13-jointed, with two ringlets; club with two joints. - - - DICHALYSIS.

× × Antennæ with no long hairs.

o Ulna as long as the humerus. - - PANSTENON.

oo Ulna shorter than the humerus.

+ Third abdominal segment covering all the following segments. - - - CRYPTOPRYMNA.

+ + Third abdominal segment not covering all the following segments.

++ Antennæ 12-jointed. . - - ISOCYRTUS.

++++ Antennæ 13-jointed.

ᔕ Fifth joint of the antennæ small. - - MICROMELUS.

ᔕᔕ Fifth joint of the antennæ of the usual size.

Λ Stigma very large. - - - LAMPROTATUS.

ΛΛ Stigma not large.

V Petiole very long. - - - SPHEGIGASTER.

VV Petiole not long.

> Abdomen compressed. - - - TOXEUMA.

> > Abdomen not compressed.

< Abdomen not half as broad as the thorax. - TITYROS.

< < Abdomen about as broad as the thorax.

¶ Third abdominal segment almost as large as the second.
+ Hind border of the second segment much curved. - - - CYRTOGASTER, Fem.
++ Hind border of the second segment quite straight. - - - - ISOCRATUS.
¶¶ Third abdominal segment much smaller than the second.
+ Second abdominal segment hardly one-third of the length of all the following segments together. - - - MERISUS.
++ Second abdominal segment more than half the length of all the following segments together.
= One mandible curved, the other straight. - DICYCLUS.
== Both mandibles straight. - - PACHYLARTHRUS, Fem.

Several of the genera in this family hardly belong to it, but they are represented by very few species, and may be considered as abnormal genera and not as the types of new families. Foerster considers Caratomus to belong to this family and not to the Perilampidæ, with which it has been previously placed. He remarks the resemblance of Dipara to some of the Myrmaridæ, and suggests the identity of his genus Hypsicamara with Euneura. The name Cyrtogaster is changed by him to Dicormus, Psilocera to Dichelysis, and Prosodes to Cryptoprymna, and he mentions the affinity of Panstenon to the Cleonymidæ. Asaphes (changed by him to Isocratus) is one of the abnornal genera of the family. Coryna he alters to Pachycrepis.

Fam. 14. PTEROMALIDÆ.

A. Furrows of the parapsides complete and well-defined.
a. Antennæ 11-jointed. Abdomen wholly covered by the first segment. - - EUNOTUS.
b. Antennæ with more than 11 joints.
* Antennæ 13-jointed. - - - TRIDYMUS.
** Antennæ 12-jointed.
† Thorax not punctured. Fore wings with a hair-line proceeding from the stigma. - SYSTASIS.
†† Thorax punctured. Fore wings with no hair-line.
‡ Antennæ of the male with two ringlets and with a two-jointed club. Antennæ of

the female with two rings and with a three-jointed club. Stigma incrassated. — OXYGLYPTA.

‡‡ Antennæ with two ringlets and with a three-jointed club. Stigma not incrassated. - — STICTONOTUS.

B. Furrows of the parapsides not deeply defined.

a. Antennæ 12-jointed.

* Thorax longer than the abdomen. - - — MERAPORUS.

** Thorax shorter than the abdomen. - - — METASTENUS.

b. Antennæ 13-jointed.

* Front strongly punctured. Oviduct very prominent. - - - - — ROPTROCERUS.

** Front not or slightly punctured. Oviduct not or slightly prominent.

† Antennæ with three ringlets.

‡ Antennæ with much incrassated tips. - — METOPON.

‡‡ Tips of the antennæ not much incrassated.

§ Thorax flat above. Body slender, nearly linear. - - - - — PLATYTERMA.

§§ Thorax convex above. Body short, broad. — AMBLYMERUS.

†† Antennæ with two ringlets.

‡ Stigma much incrassated. - - - — CÆNACIS.

‡‡ Stigma not incrassated.

§ Radius much incrassated. - - - — XENOCREPIS.

§§ Radius not incrassated.

× Head with a smooth line, that extends from the base of the mandibles to the vertex. — PERIDESMIA.

× × Head with no smooth line.

o Fore wings with a strong costal excavation. — SIMOPTERUS.

oo Fore wings with no costal excavation.

→ Radius and cubitus much shortened. - — DIBRACHYS.

→→ Radius and cubitus not much shortened.

↔ The two ringlets hardly shorter than the following joints. Cheeks very broad. Hind head much excavated. - - — CŒLOPISTHIA.

↔↔ The two ringlets very small.

ᔕ Cheeks very prominent. - - - — DIGLOCHIS.

ᔕᔕ Cheeks not very prominent.

Λ Femora thick, especially the fore femora.

V Ulna incrassated.

⊳ Radius and cubitus not half the length of the ulna. - - - - — METACOLUS.

⊳⊳ Radius and cubitus more than half the length of the ulna. - - - — PANDELUS.

VV Ulna not incrassated.

⊳ Stigma curved downward, round. - — DINOTUS.

⊳⊳	Stigma not curved downward.	
⊲	Fore femora with bordered tips. Hind tibiæ with a row of fine spines. - -	PACHYCHIRUS.
⊲⊲	Forè femora without bordered tips. Hind tibiæ with no row of spines.	
=	Stigma regularly club-shaped. - -	RHOPALICUS.
==	Stigma not club-shaped, much incrassated on the inner side. - - -	ACROCORMUS.
ΛΛ	Femora slender.	
V	Radius twice longer than the ulna. -	ETROXYS.
VV	Radius not twice longer than the ulna. -	PTEROMALUS.

The above Synopsis of genera, like the rest of the classifications in these notes, is translated from Prof. Foerster's "Studien," pt. Chalcidiæ, &c., which is the most complete and methodical work on the families and genera of the tribe that has yet been published, and with the introduction which treats of the structure of the Chalcidiæ and of the preceding literature relating to them, may be used as the means of more progress in the knowledge of the species. Of these he has published very little, and there is a very large untouched field for the works of future observers. The investigation of the Pteromalidæ is much more difficult than that of the other families, owing to the immense number of species in the genus Pteromalus and the close affinity between many of them, and the frequent great difference in colour between the male and the female so that the sexes often cannot be recognized as one species till they are reared from the pupa.

Megapelte, *Foerst.*, is another name for Eunotus which has also been named Trityphus and is an example of a small distinct family. Tridymus and Seladerma are identical, so also are Stictonotus and Semiotus. Oxyglypta is nearly allied to the two preceding genera, and the three represent a family which may be distinguished from the Pteromalidæ by the strongly-marked sutures of the parapsides. The genus Metopon must be annulled, being the female of Psilocera. Platyterma and Amblymerus are sections of Pteromalus. Pachychirus is an alteration of Cheiropachys; it and Etroxys indicate a transition to the Cleonymidæ.

PTEROMALUS INSULARIS. *Fœm.*—Æneus, crassus; caput thorace paullo latius; antennæ piceæ, subclavatæ, sat graciles, articulo 1o luteo, clava longi-conica; abdomen depressum, sublanceolatum, subsessile, subtus valde angulatum, thorace brevius et angustius; pedes albidi, femoribus nigris; alæ diaphanæ, testaceo pallidissimo venosæ.

Female.—Æneous, very stout. Head and prothorax finely squamous. Head a little broader than the thorax. Antennæ

piceous, subclavate, rather slender, about as long as the thorax; first joint luteous, long, slender; club elongate-conical, much longer than the preceding joint. Prothorax short, but distinct. Sutures of the parapsides very slight. Abdomen sublanceolate, subsessile, depressed, very angular beneath, narrower and shorter than the thorax. Legs whitish; femora black except at the tips. Wings pellucid; veins very pale testaceous; ulna a little more than half the length of the humerus; radius rather shorter than the ulna, much longer than the cubitus; stigma very small. Length of the body 1½ line.

It resembles P. elevatus, *Walk.*, from which it may be distinguished by the paler legs.

Corsica. In the collection of the Rev. T. A. Marshall.

PTEROMALUS PANDENS. Group n. *Mas.*—Corpus robustum, subtilissime squameum. Caput magnum, thorace multo latius. Antennæ setulosæ, filiformes, graciles, medio frontis insertæ, corporis dimidio multo longiores; articulus 1us longissimus; clava sublanceolata. Prothorax brevissimus. Metathorax brevis, declivis. Abdomen postice sublatescens, thorace brevius et multo angustius. Pedes graciles. Alæ amplæ.

Male.—Body stout. Head and thorax very finely squamous. Head large, much broader than the thorax. Antennæ setulose, filiform, slender, inserted in the middle of the front, much more than half the length of the body; first joint very long; third and following joints to the eighth linear, separated by short petioles; club sublanceolate, nearly twice the length of the preceding joint. Prothorax very short. Sutures of the parapsides indistinct. Metathorax short, declining. Abdomen smooth, depressed, slightly increasing in breadth from the base nearly to the tip, shorter and much narrower than the thorax. Legs slender. Fore wings ample; ulna more than half the length of the humerus; radius about half the length of the ulna; cubitus somewhat shorter than the radius; stigma of moderate size.

Mas.—Æneus; antennæ nigræ basi fulvæ; pedes fulvi, femoribus nigris apice fulvis, tibiis quatuor posterioribus ex parte piceis; alæ anticæ subfumosæ, nigro venosæ.

Male.—Æneous. Antennæ black; first joint tawny. Legs tawny; femora black, with tawny tips; four posterior tibiæ partly piceous above. Fore wings slightly smoky; veins black. Length of the body 2 lines.

Torla, Spain. In the collection of the Rev. T. A. Marshall.

PTEROMALUS SEMILUTEUS. Group n. *Fœm.*—Corpus latissimum, sat crassum, subtilissime squameum. Caput thorace latius. Antennæ

graciles, fere filiformes, thorace multo breviores, clava lanceolata. Prothorax et metathorax brevissimis. Abdomen sessile, fere ovale, thoraci subæquale. Pedes breviusculi, sat graciles. Alæ parvulæ.

Female.—Body very broad, rather thick. Head and thorax very finely squamous. Head somewhat broader than the thorax. Antennæ slender, nearly filiform, much shorter than the thorax: club lanceolate, about thrice the length of the preceding joint. Thorax compact. Prothorax very short. Sutures of the parapsides very indistinct; scutellum large. Metathorax very short. Abdomen sessile, smooth, shining, nearly oval, depressed above, about equal to the thorax in length and breadth. Legs rather short and slender. Wings rather short; ulna a little less than half the length of the humerus; radius as long as the ulna; cubitus much shorter than the radius; stigma very small.

Fœm.—Niger; antennæ testaceæ; abdomen et pedes lutea; alæ diaphanæ, pallido venosæ.

Female.—Black. Antennæ testaceous. Abdomen and legs luteous. Wings very pellucid; veins pale testaceous. Length of the body $\frac{4}{5}$ line.

Corsica. In the collection of the Rev. T. A. Marshall.

Fam. 15. ELASMIDÆ.

Represented only by the genus Elasmus (Aneure, *Nees*).

Fam. 16. ELACHISTIDÆ.

A. Hind tibiæ with two long spurs. - -	EUPLECTRUS.
B. Hind tibiæ without two long spurs.	
a. Abdomen with a short petiole. - -	ELACHISTUS.
b. Abdomen sessile.	
* Furrows of the parapsides extending to the scutellum. Antennæ with two ringlets. -	AULOGYMNUS.
** Furrows of the parapsides not extending to the scutellum. Antennæ with one ringlet.	
† Antennæ 8-jointed; club not jointed in the male, with two joints in the female. -	OLYNX.
†† Antennæ 9-jointed; club 2-jointed. - -	TELEOGMUS.

The genus Olynx is founded on Ichneumon gallarum, *Linn.*

EUPLECTRUS INTACTUS. *Fœm.*—Niger, subtiliter squameus; antennæ testaceæ; thoracis latera postica albo pilosa; abdomen pallide testaceum, antice nigro ante marginatum; pedes pallide testacei; alæ limpidissimæ, testaceo pallido venosæ.

Female.—Black. Head and thorax finely squamous. Eyes bright red. Antennæ testaceous. Thorax with several long white hairs on each side of the hind part. Abdomen pale testaceous; fore half narrowly bordered with black. Legs pale testaceous. Wings very pellucid; veins pale testaceous; humerus setose; ulna a little shorter than the humerus; radius less than half the length of the ulna; cubitus shorter than the radius. Length of the body $\frac{4}{5}$ line.

This perhaps will be considered as a variety of E. bicolor, from which it is distinguished by the abdomen, which is not black towards the tip, and by the much more pellucid wings.

Corsica. In the collection of the Rev. T. A. Marshall.

Fam. 17. EULOPHIDÆ.

A. Scutellum with two furrows.
a. Antennæ 8-jointed. - - - - CIRROSPILUS.
b. Antennæ 9-jointed.
* Antennæ seated near the mouth. - - MELITTOBIA.
** Antennæ seated much above the mouth. - SOLENOTUS.
B. Scutellum without furrows.
a. Antennæ of the male pectinated, those of the female with a 2-jointed or a 3-jointed club. - - - - - EULOPHUS.
b. Antennæ of the male not pectinated. - SYMPIESIS.

The genera of this family have not been much elaborated by Prof. Foerster; he distributes it in the above five genera. Several other genera may be added to these, of which some should be removed to other families.

Melittobia has been already mentioned in these notes. Sympiesis is founded on Eulophus sericeicornis, *Nees*, which frequently occurs in England.

CIRROSPILUS BIFASCIATUS. *Fœm.* — Læte flavus, latiusculus; antennæ subclavatæ, thorace breviores; abdomen nigro bifasciatum; alæ diaphanæ, albido venosæ.

Female.—Bright yellow, rather broad. Head small, short, narrower than the thorax. Eyes piceous. Antennæ 5-jointed, subclavate, shorter than the thorax. Thorax elliptical, very finely squamous; sutures of segments indistinct. Abdomen flat, elliptical, subsessile, a little shorter and broader than the thorax, with two black bands in the middle part; hind band much more slender than the fore band. Legs slender. Wings pellucid; veins whitish; ulna much shorter than the humerus. Length of the body $\frac{1}{4}$ line.

South France, near Bordeaux. "On poplar trees." In the collection of the Rev. T. A. Marshall.

Fam. 18. ENTEDONIDÆ.

A. Antennæ 12-jointed. - - - EPICLERUS.
B. Antennæ with less than twelve joints.
a. Antennæ club-shaped. - - - RHOPALOTUS.
b. Antennæ not club-shaped.
* Antennæ of the male much serrated, of the female with pale rings. - - ASTICHUS.
** Antennæ of the male not serrated, of the female without pale rings.
† Scutellum with a middle furrow. - - HOLCOPELTE.
†† Scutellum with no middle furrow.
‡ Fore wings with many rows of hairs. - EUDERUS.
‡‡ Fore wings not with many rows of hairs.
§ Fore wings with a costal areolet. - SECODES.
§§ Fore wings with no costal areolet.
× Radius ending just beyond the cubitus.
o Humerus much incrassated. - - PLEUROPACHYS.
oo Humerus not much incrassated.
-+ Metathorax with side keels. - - PLEUROTROPIS.
-+-+ Metathorax without side keels.
+-+ Scutellum very squamous. - - ENTEDON.
+-+-+ Scutellum smooth. - - - ASECODES.
× × Radius not ending just beyond the cubitus.
o Abdomen much acuminated. - - OMPHALE.
oo Abdomen not much acuminated.
-+ Antennæ 8-jointed. - - - CHRYSOCHARIS.
-+-+ Antennæ 9-jointed. - - - DEROSTENUS.

Foerster remarks the likeness between Epiclerus and Tetracampe. The latter has 5-jointed tarsi and is the only representative of the Tetracampidæ, which may be noticed in some future publication. Rhopalotus is founded on Elachistus cothurnatus, *Nees*, and on E. gradualis, *Nees;* Holcopelte on E. obscurus, *Foerst.*

Fam. 19. TETRASTICHIDÆ.

A. Scutellum without furrows.
a. Antennæ apparently 3-jointed. - - TRIPHASIUS.
b. Antennæ distinctly more than 3-jointed.
* Fore wings without a cubitus. - - ANOZUS.
** Fore wings with a cubitus.
† Fore wings bordered all round with long hairs. PTEROTHRIX.
†† Costa of the fore wings without long hairs. - TRICHAPORUS.
B. Scutellum with furrows.

a. First joint of the antennæ much incrassated.
* Fore wings fringed around with long hairs. - CERANISUS.
** Costa of the fore wings not fringed with long hairs. - - - - - BARYSCAPUS.
b. First joint of the antennæ not incrassated.
* Antennæ 10-jointed, without ringlets. - HYPERTELES.
* Antennæ of the male 9-jointed, without ringlets; of the female 10-jointed, with two ringlets and with a 3-jointed club. - TETRASTICHUS.

Triphasius and Thysanus are identical; this genus should be removed from the Tetrastichidæ. Hyperteles is founded on Eulophus elongatus, *Foerst.*

Fam. 20. TRICHOGRAMMIDÆ.

A. Fore wings with lines of hairs.
a. Humerus and ulna not united. - - POROPŒA.
b. Humerus and ulna united.
* Antennæ 8-jointed. Humerus forming a curve. TRICHOGRAMMA.
** Antennæ with less than eight joints. Humerus not forming a curve.
† Wings fringed around with long hairs. - CHŒTOSTICHA.
†† Wings with some short hairs between the radius and the tip.
‡ Antennæ 7-jointed, with a ringlet and with a 4-jointed club. - - - - LATHROMERIS.
‡‡ Antennæ 6-jointed, with no ringlet and with a three-jointed club. - - - CENTROBIA.
B. Fore wings without lines of hairs.
a. Antennæ 7-jointed. - - - - ASYNACTA.
b. Antennæ 6-jointed.
* Fore wings broad, with a pubescent border. - BRACHISTA.
* Fore wings narrow, fringed with long hairs. - OLIGOSITA.

Poropœa and Ophioneurus, *Ratz.*, are one genus. Brachista, *Hal.*, is altered by Foerster to Brachysticha.

NOTES

ON

CHALCIDIÆ.

PART VII.

BY

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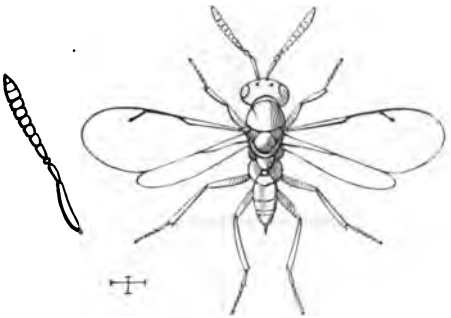
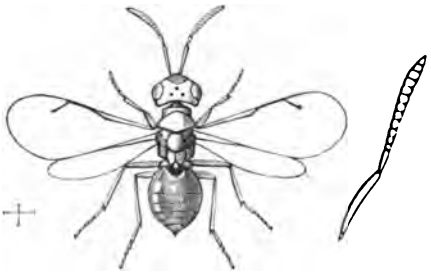
NOTES ON CHALCIDIÆ.

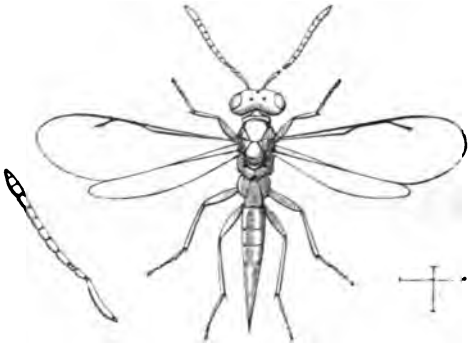
PART VII.



Eutelus immaculatus.

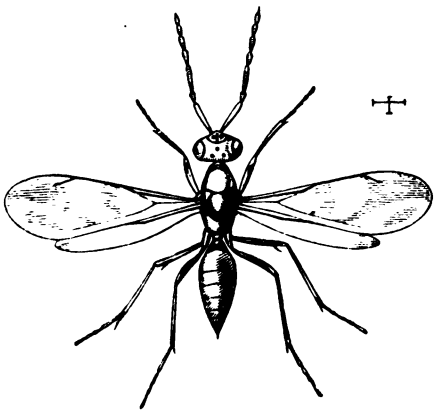


Pteromalus latus.



Ætroxys scenicus.

Eunotus cretaceus.



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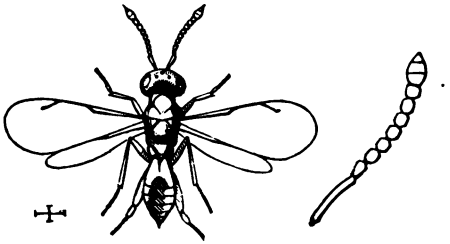
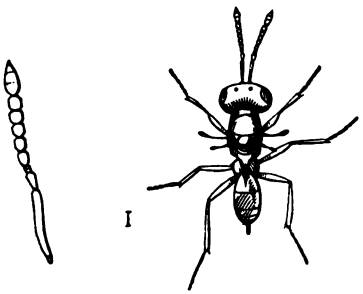
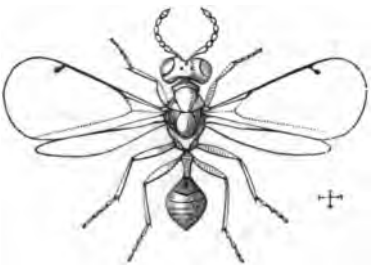


Prosopon montanum.



Micromelus pyrrhogaster.



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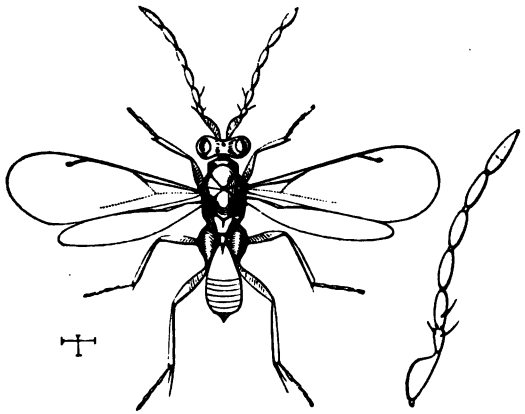
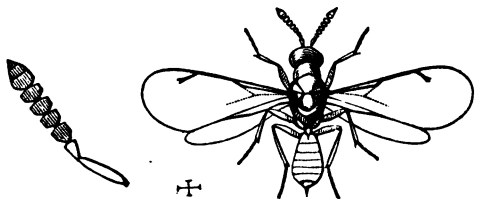


Euplectrus albiventris.



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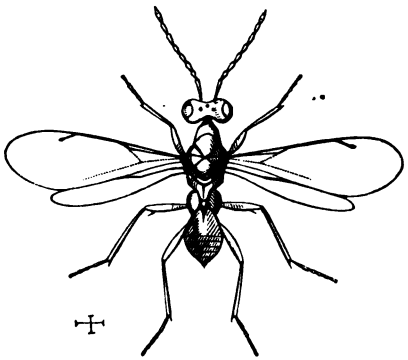
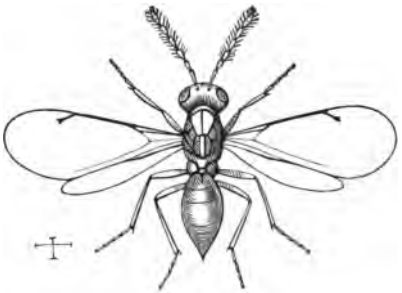
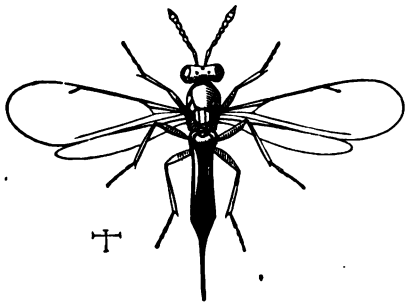


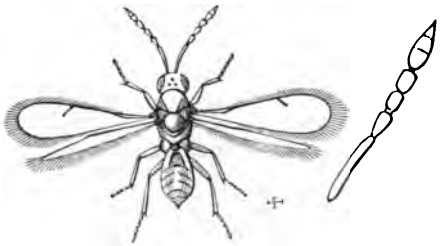
Cirrospilus pulchellus.



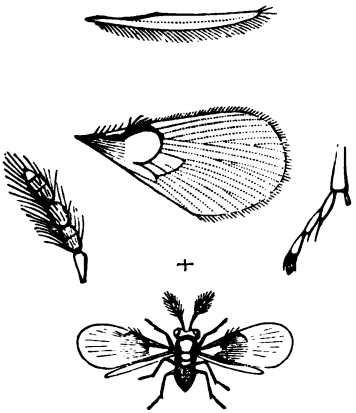
Cirrospilus Attalus.



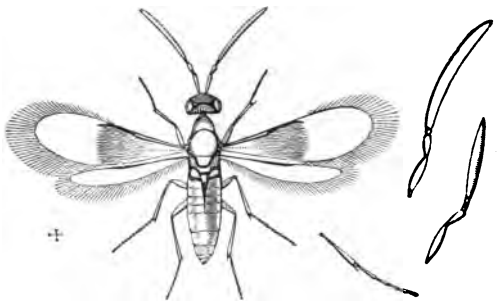
Tetrastichus caudatus.



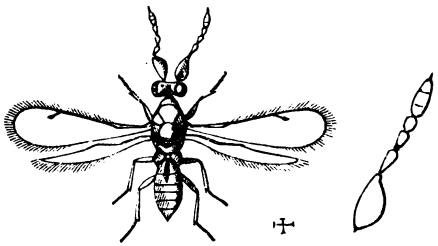
Pteroptrix Menes.



Trichogramma evanescens.



Thusanus ater.



Cirrospilus Pacuvius.

THE conclusion of this Part contains a notice of the species of Chalcidiæ in Madeira, omitting those which have been previously enumerated. The latter will be found in the 'Annals and Magazine of Natural History,' 2nd ser. vol. iii., and 3rd ser. vol. i., and in the previous Parts of these Notes. The following species have been already described:—Spalangia nigra, Asaphes ænea, Pteromalus flammifer, P. æquus, P. conspersus, P. fulviventris, Platynocheilus Derceto, Aphelinus basalis, A. Asychis, Encyrtus Zetterstedti, Entedon Epigonus, Eulophus Gonippus, E. Artynes, Cirrospilus Diallus. The new species here noticed are nearly all closely allied to the British Chalcidiæ, and it would not be right as yet to suppose that they are peculiar to Madeira, or do not occur in the same latitudes of Africa. Cleptimorpha is a remarkable form, and very different from any other genus previously published.

ENCYRTUS COLLIGATUS. *Fœm.*—Æneus; caput luteum; antennæ fuscæ, subclavatæ, thorace multo breviores, clava pallide flava; abdomen longi-conicum, thorace paullo longius; pedes pallide flavi; alæ anticæ fascia lata maculisque duabus exterioribus fuscis, apice cinereæ.

Female.—Æneous. Head luteous. Antennæ brown, subclavate, much shorter than the thorax; club pale yellow. Abdomen elongate-conical, a little longer than the thorax. Legs pale yellow. Wings pellucid. Fore wings with a broad brown band before the middle and with two exterior brown spots, one on the costa, the other on the hind border; tips cinereous; veins pale, except in the brown part. Length of the body ⅔ line. Allied to E. tessellatus; much smaller.

ENCYRTUS CONGRUUS. *Mas et fœm.*—Æneus aut viridis; abdomen longi-conicum, thorace brevius et angustius; pedes flavi, femoribus tibiisque nigris basi apiceque flavis; alæ diaphanæ, pallido venosæ. *Mas.*—Antennæ testaceæ, filiformes, thorace multo longiores. *Fœm.*—Antennæ nigræ, clavatæ, thoraci æquilongæ.

Male and female.—Æneous or green. Antennæ testaceous, filiform, and much longer than the thorax in the male, black, clavate, and as long as the thorax in the female. Abdomen elongate-conical, shorter and narrower than the thorax. Legs yellow; femora and tibiæ black, yellow at the base and at the tips. Wings pellucid; veins pale; ulna black. Length of the body ⅔ line.

METALLON ATRICEPS. *Mas.*—Luteus; caput atrum; antennæ atræ, filiformes, corpore paullo breviores, clava lanceolata; prothorax brevis; scutellum magnum; metathorax niger, subquadratus; abdomen nigrum, sessile, fere rotundum, basi luteum; alæ diaphanæ

fusco venosæ. *Fœm.*—Subapterus. Antennæ subclavatæ, thorace multo breviores, clava conica; abdomen longi-conicum, thorace brevius, dimidio basali luteo.

Male.—Luteous. Head and antennæ deep black. Antennæ filiform, a little shorter than the body; club lanceolate, full twice the length of the preceding joint. Prothorax short. Sutures of the parapsides not traced. Scutellum large, elongate-triangular. Metathorax black, subquadrate. Abdomen black, sessile, nearly round, luteous at the base, about half the length of the thorax, which it equals in breadth. Wings pellucid; veins brown; humerus extending to about half the length; ulna extremely short; cubitus long, shorter than the radius. *Female.*—Antennæ subclavate, much shorter than the body; club conical. Abdomen elongate-conical, shorter than the thorax, luteous for half the length from the base. Wings rudimentary. Length of the body $\frac{2}{3}$—$\frac{3}{4}$ line.

Ectroma maderensis. *Fœm.*—Viridi-lutea, aptera; caput latum; antennæ nigræ, subclavatæ, basi luteæ, corpore multo breviores; prothorax transversus, bene determinatus; metathorax quadratus, maximus; abdomen nigrum, sessile, conicum, basi luteum, thorace multo brevius; oviductus albus, apice fuscus; pedes pallide flavi.

Female.—Luteous, apterous, tinged with metallic-green. Head broader than the prothorax and the mesothorax. Antennæ black, subclavate, inserted close to the mouth, much shorter than the body; scape luteous, somewhat shorter than the flagellum. Prothorax transverse, much developed. Paraptera large. Metathorax quadrate, very large, broader than the mesothorax. Abdomen sessile, conical, black, except towards the base, much shorter than the thorax. Oviduct subexserted, white, except at the tip. Legs pale yellow. Length of the body $\frac{1}{3}$ line.

Gastrancistrus pallicornis. *Fœm.*—Viridi-niger; oculi rufi, maximi; antennæ pallidissime flavæ, subclavatæ, thorace paullo longiores; prothorax brevissimus; parapsidum suturæ bene determinatæ; abdomen longi-ovatum, depressum, subpetiolatum, thorace multo angustius; alæ diaphanæ, venis pallidissime flavis.

Female.—Greenish black. Head, with the eyes, nearly as broad as the prothorax. Eyes red, very large, the breadth of each exceeding that of the vertex between them. Antennæ very pale yellow, subclavate, a little longer than the thorax. Prothorax extremely short, depressed; sutures of the parapsides well defined. Abdomen subpetiolated, elongate-oval, much narrower than the thorax. Legs very pale yellow. Wings quite colourless; veins very pale yellow; ulna less than half the length of the humerus. Length of the body $\frac{2}{3}$ line.

DICYCLUS PALLINERVOSUS. *Fœm.*—Æneo-viridis; caput thorace paullo latius; antennæ nigræ, clavatæ, thorace breviores, articulo 1o luteo; prothorax brevissimus: parapsidum suturæ conspicuæ; abdomen subsessile, ovatum, subtus abrupte angulatum, thorace multo brevius; pedes lutei, femoribus subfuscescentibus, tibiis posticis basi subfuscescentibus; alæ diaphanæ, venis pallidissime flavis.

Female.—Æneous-green. Head and thorax finely squamous. Head a little broader than the thorax. Antennæ black, clavate, shorter than the thorax; first joint luteous; the two ring-shaped joints following the second very short; club conical, about twice the length of the preceding joint. Prothorax very short. Sutures of the parapsides distinct. Scutellum short, transversely subelliptical. Paraptera large, triangular. Metathorax large, not furrowed. Abdomen subsessile, oval, smooth, flat above, abruptly angular beneath, much shorter than the thorax, and about equal to it in breadth. Legs luteous; femora partly tinged with brown; hind tibiæ slightly tinged with brown towards the base; tips of tarsi brown. Wings entirely colourless; veins very pale yellow; ulna about one-fifth of the length of the humerus; radius much shorter than the ulna; cubitus much longer than the ulna; stigma very small. Length of the body 1 line.

The very pale veins of the wings distinguish it from other species.

SPHEGIGASTER DEGENER. *Fœm.*—Viridis; caput thorace paullo latius; antennæ nigræ, subclavatæ, graciles, thoraci æquilongæ; prothorax brevis; metathorax bene determinatus; petiolus brevis; abdomen ellipticum, thorace multo brevius; pedes lutei, tarsis quatuor posterioribus pallidioribus; alæ diaphanæ, venis pallidissime flavis.

Female.—Bright green. Head and thorax squamous. Head a little broader than the thorax. Antennæ black, slender, subclavate, as long as the thorax. Prothorax very short. Sutures of the parapsides indistinct. Metathorax well developed. Petiole short. Abdomen elliptical, very much shorter than the thorax. Legs luteous; middle and hind tarsi pale luteous, with brown tips. Wings pellucid; veins very pale yellow; ulna about half the length of the humerus; radius a little shorter than the ulna; cubitus much shorter than the ulna; stigma very small. Length of the body ¾ line.

It may be considered as a species of Sphegigaster, notwithstanding the shortness of the petiole.

STICTONOTUS INSUETUS. *Fœm.*—Æneo-viridis; caput thorace multo latius; antennæ nigricantes, clavatæ, thorace breviores, articulo 1o luteo, clava longi-conica; parapsidum suturæ bene determinatæ, postice obliteratæ; paraptera magna; abdomen ovatum,

thorace paullo brevius; pedes lutei; alæ diaphanæ, venis pallidissime luteis, stigmate minimo.

Female.—Æneous-green. Head much broader than the thorax. Antennæ blackish, clavate, shorter than the thorax; first joint luteous; second elongate-cyathiform; third and fourth very minute; fifth and five following transverse, successively decreasing in length; club elongate-conical, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides well defined, not extending to the hind border of the scutum. Paraptera large. Metathorax short. Abdomen oval, sessile, a little shorter than the thorax. Legs luteous, stout; tips of the tarsi brown. Wings pellucid; veins very pale luteous; ulna less than one-third of the length of the humerus; radius longer than the ulna; cubitus a little longer than the ulna; stigma very small. Length of the body 1 line.

METASTENUS PURUS. *Fœm.*—Cupreus; caput et thorax aureo-viridi marginata; caput thorace paullo latius; antennæ fulvæ, clavatæ, 12-articulatæ, thorace vix breviores, articulo 1o luteo; prothorax brevissimus; parapsidum suturæ indeterminatæ; metathorax sat magnus; abdomen sessile, fusiforme, depressum, thoraci æquilongum; pedes flavi; alæ diaphanæ, venis pallide testaceis, stigmate minimo.

Female.—Cupreous. Head and thorax bordered with gilded green. Head a little broader than the thorax. Antennæ tawny, clavate, 12-jointed, nearly as long as the thorax; first joint luteous; second elongate-cyathiform; third and fourth larger than usual; fifth and five following nearly equal in length; club elliptical, broader than the ninth joint, and more than twice its length. Prothorax very short. Sutures of the parapsides indistinct. Paraptera large. Metathorax well developed. Abdomen sessile, fusiform, depressed, acute at the tip, as long as the thorax and a little broader. Legs bright yellow. Wings quite pellucid; veins pale testaceous; ulna rather shorter than the humerus; radius rather shorter than the ulna; cubitus a little more than half the length of the ulna; stigma very small. Length of body $\frac{4}{5}$ line.

PTEROMALUS TINCTIPENNIS. *Fœm.*—Aureo-viridis; caput thorace multo latius; antennæ fuscæ, graciles, vix extrorsum crassiores, thorace paullo breviores, articulo 1o luteo, 2o basi luteo, clava sublanceolata; paraptera sat magna; metathorax transverse, subimpressus; abdomen cupreo nigro-purpureoque varium, apicem versus lanceolatum, thorace multo longius; pedes lutei; alæ anticæ lutescentes, luteo venosæ, stigmate nigricante.

Female.—Bright green. Head much broader than the thorax. Antennæ brown, slender, very slightly increasing in thickness towards the tips, a little shorter than the thorax; first joint luteous; second elongate-cyathiform, luteous at the base; third and fourth minute; fifth and five following linear, successively and very slightly decreasing in length; club sublanceolate, a little more than twice the length of the tenth joint. Thorax gilded green. Prothorax very short. Sutures of the parapsides very indistinct. Paraptera rather large. Metathorax sloping, rather large, transversely and slightly impressed in the middle. Abdomen sessile, much longer than the thorax, varied with gilded cupreous and blackish purple hues, concave in the disk, lanceolate towards the tip; apical segment lanceolate, convex, about one-third of the length of the preceding part. Legs luteous, slender; tarsi brownish at the tips. Wings with a luteous tinge, which is most distinct in the fore wings, from the end of the humerus to the stigma; veins luteous; humerus much longer than the ulna; radius as long as the ulna; cubitus much shorter than the radius; stigma blackish, rather large. Length of the body 3 lines.

PTEROMALUS INTEGER. *Mas.*—Aureo-viridis; caput thorace paullo latius; antennæ nigræ, subclavatæ, thorace paullo breviores, articulo 1o luteo, clava subfusiformi; paraptera sat parva; abdomen nigro-purpureum, fere lineare, basi aureo-viride, thorace brevius et multo angustius; pedes lutei; alæ subcinereæ, venis pallide lutescentibus, stigmate fusco. *Fœm.*—Cupreus; antennæ fuscæ; abdomen lanceolatum, subtus carinatum et angulatum, thorace multo longius, apice compressum.

Male.—Gilded green, rather stout. Head a little broader than the thorax. Antennæ black, subclavate, a little shorter than the thorax; first joint luteous; second cyathiform; third and fourth very minute; fifth and five following successively and very slightly decreasing in length; club subfusiform, a little more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides extremely indistinct. Scutellum broad. Paraptera rather small. Metathorax short, sloping. Abdomen blackish purple, sessile, nearly linear, golden green at the base, shorter and much narrower than the thorax. Legs luteous, rather stout; tips of tarsi pale brown. Wings slightly cinereous; veins pale lutescent; ulna about half the length of the humerus; radius a little longer than the ulna; cubitus a little shorter than the radius; stigma brown. *Female.*—Cupreous. Antennæ brown. Abdomen lanceolate, much longer than the thorax, beneath keeled, and obliquely ascending towards the tip; three last segments longer than the preceding segment; apical segment compressed. Length of the body $1\frac{1}{4}$—$1\frac{3}{4}$ line.

PTEROMALUS CONTAMINATUS. *Fœm.*—Aurato-viridis; caput thorace paullo latius; antennæ fuscæ, subclavatæ, thorace paullo breviores, articulo 1o luteo, clava lanceolata; paraptera sat parva; abdomen fusiforme, depressum, apice compressum, thorace paullo longius et multo angustius; pedes lutei; alæ subcinereæ, venis fulvis, stigmate nigro.

Female.—Gilded green. Head a little broader than the thorax. Antennæ brown, subclavate, a little shorter than the thorax; first joint luteous; second elongate-cyathiform; third and fourth very minute; fifth and five following successively and slightly decreasing in length; club lanceolate, a little more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides extremely indistinct. Scutellum rather broad. Paraptera rather small. Abdomen sessile, fusiform, depressed in the disk, much narrower and a little longer than the thorax; apical segment compressed. Legs luteous, rather stout; tips of tarsi brown. Wings slightly cinereous; veins tawny; ulna about half the length of the humerus; radius a little longer than the ulna; cubitus a little shorter than the ulna; stigma black. Length of the body 1¼ line.

It much resembles P. integer; the abdomen is shorter and not keeled beneath, nor elongated and ascending towards the tip; the stigma is a little larger.

PTEROMALUS ALTERNIPES. *Fœm.*—Cupreus; caput thorace paullo latius; antennæ nigræ, subclavatæ, thorace multo breviores, clava lanceolata; paraptera sat magna; abdomen cupreo-nigrum, lanceolatum, depressum, basi cupreum, subtus carinatum, apice compressum; pedes nigri, tibiis basi apiceque tarsisque pallide luteis; alæ anticæ vix testaceo suffusæ, venis lutescentibus.

Female.—Cupreous. Head a little broader than the thorax. Antennæ black, subclavate, much shorter than the thorax; second joint elongate-cyathiform; third and fourth very minute: fifth and five following successively decreasing in length; club lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides very indistinct. Paraptera rather large. Metathorax short. Abdomen sessile, lanceolate, cupreous-black, cupreous at the base, depressed above, a little longer and much narrower than the thorax, keeled beneath, compressed at the tip. Legs black; knees, tibiæ towards the base and towards the tips and tarsi pale luteous; tips of the latter black. Fore wings slightly tinged with testaceous; veins dingy luteous; humerus nearly twice the length of the ulna; radius a little shorter than the ulna; cubitus much shorter than the ulna; stigma not darker than the veins. Length of the body 1¼ line.

PTEROMALUS NIGRICANS. *Fœm.*—Cyaneo-niger; caput thorace multo latius; antennæ fuscæ, extrorsum crassiores, thorace non longiores, articulo 1o luteo, clava lanceolata; abdomen longi-ovatum, basi apice æneum, subtus abrupte angulatum, thorace paullo brevius vix angustius; pedes fusci, tibiis basi apiceque tarsisque flavescente albis; alæ diaphanæ, venis pallidissime testaceis, stigmate minimo. *Mas?*—Aurato-viridis; antennæ luteæ; pedes flavi.

Female.—Bluish black. Head much broader than the thorax. Antennæ brown, slightly increasing in thickness towards the tips; first joint luteous; second elongate-cyathiform; third and fourth very minute; fifth and five following successively and slightly decreasing in length; club lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides very indistinct. Metathorax short. Abdomen sessile, æneous towards the base and towards the tip, elongate-oval, abruptly angular and ascending beneath towards the tip, a little shorter and hardly narrower than the thorax. Legs brown; knees, tibiæ at the base and at the tips and tarsi yellowish white. Wings pellucid; veins very pale testaceous; ulna less than half the length of the humerus; radius a little shorter than the ulna; cubitus as long as the radius; stigma very small. *Male?*—Gilded green. Antennæ luteous. Legs yellow. Length of the body $1\frac{1}{6}$ line.

PTEROMALUS DULCIS. *Mas.*—Aurato-viridis; caput thorace multo latius; antennæ luteæ, thorace breviores, clava fusca lanceolata; paraptera magna; metathorax subcarinatus; abdomen cupreum, fere lineare, busi aureo-viride; pedes flavi, femoribus luteis; alæ anticæ sublutescentes, venis testaceis, stigmate mediocri.

Male.—Gilded green. Head much broader than the thorax. Antennæ luteous, slightly increasing in thickness towards the tips; second joint elongate-cyathiform; third and fourth very minute; fifth and five following successively decreasing in length; club brown, lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides very indistinct. Paraptera large. Metathorax well developed, with a slight longitudinal furrow. Abdomen sessile, nearly linear, cupreous, gilded green at the base. Legs yellow; femora luteous. Wings pellucid. Fore wings with a slight luteous tinge; veins testaceous; ulna about half the length of the humerus; radius longer than the ulna; cubitus much shorter than the ulna; stigma of moderate size. Length of the body $1\frac{2}{3}$ line.

PTEROMALUS CONSUETUS. *Mas.*—Æneus; caput thorace latius; antennæ nigræ, extrorsum cassiores, thorace paullo longiores, clava

lanceolata, paraptera magna; abdomen fere lineare, thorace multo angustius vix brevius; pedes lutei; alæ cinereæ, venis fuscis, stigmate mediocri.

Male.—Æneous. Head broader than the thorax. Antennæ black, a little longer than the thorax, slightly increasing in thickness towards the tips: second joint elongate-cyathiform; third and fourth very minute; fifth and five following successively decreasing in length; club lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides indistinct. Paraptera large. Abdomen sessile, nearly linear, much narrower than the thorax and about equal to it in length. Legs luteous. Wings cinerous; veins brown; humerus more than twice the length of the ulna; radius longer than the ulna; cubitus a little shorter than the ulna; stigma of moderate size. Length of the body $\frac{4}{5}$ line.

Pteromalus obscurellus. *Mas.*—Saturate viridis; caput thorace multo latius; antennæ nigræ, lineares, clava lanceolata; abdomen flavescente unifasciatum; pedes lutei, femoribus fuscescentibus; alæ anticæ fuscescentes, venis nigris, stigmate parvo.

Male.—Dark green. Head much broader than the thorax. Antennæ black; second joint elongate-cyathiform; third and fourth very minute; fifth and five following elongate, linear, nearly equal; club lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides indistinct. Abdomen sessile, with a yellowish band at a little before the middle. Legs luteous; femora mostly brownish. Fore wings brownish; veins black; ulna about half the length of the humerus; radius much longer than the ulna; cubitus longer than the ulna; stigma small. Length of the body $\frac{1}{2}$ line.

Pteromalus obumbratus. *Mas.*—Saturate viridis; caput thorace multo latius; antennæ nigricantes, extrorsum crassiores, articulo 1o fulvo, clava fusiformi; paraptera magna; abdomen cupreo-nigrum, fere lineare, thorace brevius et paullo angustius, plaga magna flavescente ornatum; pedes lutei, femoribus obscurioribus; alæ cinereæ, venis testaceis, stigmate magno nigricante.

Male.—Dark green. Head much broader than the thorax. Antennæ blackish, slightly increasing in thickness towards the tips; first joint tawny; second cyathiform; third and fourth very minute; fifth and five following successively and slightly decreasing in length; club fusiform, broader than the tenth, and a little more than twice its length. Prothorax very short. Sutures of the parapsides very indistinct. Paraptera large. Metathorax rather small. Abdomen cupreous-black, sessile, nearly linear, shorter and a little narrower

PTEROMALUS NIGRICANS. *Fœm.*—Cyaneo-niger; caput thorace multo latius; antennæ fuscæ, extrorsum crassiores, thorace non longiores, articulo 1o luteo, clava lanceolata; abdomen longi-ovatum, basi apice æneum, subtus abrupte angulatum, thorace paullo brevius vix angustius; pedes fusci, tibiis basi apiceque tarsisque flavescente albis; alæ diaphanæ, venis pallidissime testaceis, stigmate minimo. *Mas?*—Aurato-viridis; antennæ luteæ; pedes flavi.

Female.—Bluish black. Head much broader than the thorax. Antennæ brown, slightly increasing in thickness towards the tips; first joint luteous; second elongate-cyathiform; third and fourth very minute; fifth and five following successively and slightly decreasing in length; club lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides very indistinct. Metathorax short. Abdomen sessile, æneous towards the base and towards the tip, elongate-oval, abruptly angular and ascending beneath towards the tip, a little shorter and hardly narrower than the thorax. Legs brown; knees, tibiæ at the base and at the tips and tarsi yellowish white. Wings pellucid; veins very pale testaceous; ulna less than half the length of the humerus; radius a little shorter than the ulna; cubitus as long as the radius; stigma very small. *Male?*—Gilded green. Antennæ luteous. Legs yellow. Length of the body $1\frac{1}{6}$ line.

PTEROMALUS DULCIS. *Mas.*—Aurato-viridis; caput thorace multo latius; antennæ luteæ, thorace breviores, clava fusca lanceolata; paraptera magna; metathorax subcarinatus; abdomen cupreum, fere lineare, busi aureo-viride; pedes flavi, femoribus luteis; alæ anticæ sublutescentes, venis testaceis, stigmate mediocri.

Male.—Gilded green. Head much broader than the thorax. Antennæ luteous, slightly increasing in thickness towards the tips; second joint elongate-cyathiform; third and fourth very minute; fifth and five following successively decreasing in length; club brown, lanceolate, more than twice the length of the tenth joint. Prothorax very short. Sutures of the parapsides very indistinct. Paraptera large. Metathorax well developed, with a slight longitudinal furrow. Abdomen sessile, nearly linear, cupreous, gilded green at the base. Legs yellow; femora luteous. Wings pellucid. Fore wings with a slight luteous tinge; veins testaceous; ulna about half the length of the humerus; radius longer than the ulna; cubitus much shorter than the ulna; stigma of moderate size. Length of the body $1\frac{2}{3}$ line.

PTEROMALUS CONSUETUS. *Mas.*—Æneus; caput thorace latius; antennæ nigræ, extrorsum cassiores, thorace paullo longiores, clava

the ulna; cubitus a little more than half the length of the ulna; stigma large, blackish. Length of the body 1⅔ line.

ELACHISTUS ÆQUALIS. *Mas.*—Viridis; caput thoraci æquilatum; antennæ testaceæ, filiformes, thorace non longiores, clava lanceolata; parapsidum suturæ bene determinatæ; abdomen lineare, thorace angustius et paullo brevius; pedes flavi; alæ fere diaphanæ, venis pallide testaceis, stigmate minimo.

Male.—Green. Head as broad as the thorax. Eyes red. Antennæ filiform, testaceous, not longer than the thorax; second joint elongate-cyathiform; third and three following linear, nearly equal; club lanceolate, about twice the length of the sixth joint. Prothorax very short. Sutures of the parapsides strongly marked. Abdomen linear, narrower and a little shorter than the thorax. Legs yellow. Wings nearly pellucid; veins pale testaceous; ulna longer than the humerus; radius much shorter than the ulna; stigma very small. Length of the body ⅔ line.

ELACHISTUS CONTRACTUS. *Mas.*—Saturate viridis; antennæ testaceæ; parapsidum suturæ bene determinatæ; abdomen æneo-viride, fere lineare; pedes flavi, femoribus basi nigris; alæ anticæ testaceo suffusæ, venis pallide testaceis, stigmate minimo.

Male.—Dark green. Antennæ testaceous. Sutures of the parapsides strongly marked. Abdomen æneous-green, nearly linear. Legs yellow; femora black towards the base. Fore wings with a testaceous tinge; veins pale testaceous; ulna longer than the humerus; radius much shorter than the ulna; stigma very small. Length of the body ⅓ line.

EULOPHUS SOBRIUS. *Fœm.*—Æneus; caput viride; antennæ nigræ, subclavatæ; prothorax et scutellum punctata, ille brevis; parapsidum suturæ bene determinatæ; metathorax brevis, subsulcatus; abdomen æneo-nigrum, ellipticum, thorace longius et latius; pedes fulvi; alæ cinereæ, fulvo-venosæ.

Female. Æneous. Head green, contracted in the middle, a little broader than the thorax. Antennæ black, subclavate, slender, a little shorter than the thorax; second joint elongate-cyathiform; third linear, much longer than the fourth; fourth, fifth and sixth successively decreasing in length; club conical, about twice the length of the sixth joint. Prothorax and scutum punctured. Prothorax short. Sutures of the parapsides well defined, wide apart. Paraptera large. Metathorax short, with a slight furrow. Abdomen æneous-black, elliptical, longer and broader than the thorax. Legs tawny. Wings cinereous; veins tawny; humerus longer than the

ulna; radius shorter than the ulna; cubitus nearly half the length of the radius; stigma small. Length of the body 1¼ line.

EULOPHUS DIVISUS. *Fœm.*—Æneo-viridis, gracilis; caput thorace latius; antennæ fuscæ, extrorsum crassiores, thoraci æquilongæ, articulo 1o luteo apice fusco, clava lanceolata; scutum antice attenuatum; parapsidum suturæ indeterminatæ; metathorax tricarinatus, bene determinatus; abdomen longi-ellipticum, vix petiolatum, thorace brevius; pedes lutei; alæ diaphanæ, venis pallide testaceis, stigmata minimo.

Female.—Æneous-green, slender. Head broader than the thorax. Antennæ brown, as long as the thorax, slightly increasing in thickness towards the tips; first joint luteous, brown towards the tip; second rather short; third and three following linear, successively decreasing in length; club lanceolate, much longer than the sixth joint. Prothorax very short. Scutum attenuated in front; sutures of the parapsides very indistinct. Metathorax well developed, with three keels. Abdomen elongate-elliptical, hardly petiolated, shorter than the thorax. Legs luteous. Wings pellucid; veins pale testaceous; ulna very much longer than the humerus; radius less than half the length of the ulna; stigma very small. Length of the body ⅘ line.

EULOPHUS ENTEDONOIDES. *Mas.*—Aureo-viridis; antennæ nigræ, filiformes, clava lanceolata; parapsidum suturæ bene determinatæ; metathorax bene determinatus; abdomen planum, subovatum, subpetiolatum, thorace multo brevius; pedes flavi; alæ anticæ subcinereæ, venis pallidissime testaceis, stigmate minimo.

Male.—Gilded green. Head a little broader than the thorax. Antennæ black, filiform; second joint subcyathiform; third and three following linear, successively and slightly decreasing in length; club lanceolate, very much longer than the sixth joint. Prothorax very short. Sutures of the parapsides strongly marked. Metathorax much developed. Abdomen somewhat oval, flat, slightly petiolated, much shorter than the thorax. Legs yellow. Wings slightly cinereous; veins very pale testaceous; ulna very much longer than the humerus; radius about half the length of the humerus; cubitus descending rather abruptly towards the disk; stigma very small. Length of the body ¾ line.

EULOPHUS CENTRALIS. *Mas et fœm.*—Læte viridis; antennæ fuscæ, thoraci æquilongæ, maris filiformes, fœm. subclavatæ; parapsidum suturæ bene determinatæ; abdomen maris longi-ovatum, fœm. ellipticum; thorace brevius; pedes flavi; alæ anticæ plaga discali fusca.

the ulna; cubitus a little more than half the length of the ulna; stigma large, blackish. Length of the body 1⅔ line.

ELACHISTUS ÆQUALIS. *Mas.*—Viridis; caput thoraci æquilatum; antennæ testaceæ, filiformes, thorace non longiores, clava lanceolata; parapsidum suturæ bene determinatæ; abdomen lineare, thorace angustius et paullo brevius; pedes flavi; alæ fere diaphanæ, venis pallide testaceis, stigmate minimo.

Male.—Green. Head as broad as the thorax. Eyes red. Antennæ filiform, testaceous, not longer than the thorax; second joint elongate-cyathiform; third and three following linear, nearly equal; club lanceolate, about twice the length of the sixth joint. Prothorax very short. Sutures of the parapsides strongly marked. Abdomen linear, narrower and a little shorter than the thorax. Legs yellow. Wings nearly pellucid; veins pale testaceous; ulna longer than the humerus; radius much shorter than the ulna; stigma very small. Length of the body ⅔ line.

ELACHISTUS CONTRACTUS. *Mas.*—Saturate viridis; antennæ testaceæ; parapsidum suturæ bene determinatæ; abdomen æneo-viride, fere lineare; pedes flavi, femoribus basi nigris; alæ anticæ testaceo suffusæ, venis pallide testaceis, stigmate minimo.

Male.—Dark green. Antennæ testaceous. Sutures of the parapsides strongly marked. Abdomen æneous-green, nearly linear. Legs yellow; femora black towards the base. Fore wings with a testaceous tinge; veins pale testaceous; ulna longer than the humerus; radius much shorter than the ulna; stigma very small. Length of the body ⅓ line.

EULOPHUS SOBRIUS. *Fœm.*—Æneus; caput viride; antennæ nigræ, subclavatæ; prothorax et scutellum punctata, ille brevis; parapsidum suturæ bene determinatæ; metathorax brevis, subsulcatus; abdomen æneo-nigrum, ellipticum, thorace longius et latius; pedes fulvi; alæ cinereæ, fulvo-venosæ.

Female. Æneous. Head green, contracted in the middle, a little broader than the thorax. Antennæ black, subclavate, slender, a little shorter than the thorax; second joint elongate-cyathiform; third linear, much longer than the fourth; fourth, fifth and sixth successively decreasing in length; club conical, about twice the length of the sixth joint. Prothorax and scutum punctured. Prothorax short. Sutures of the parapsides well defined, wide apart. Paraptera large. Metathorax short, with a slight furrow. Abdomen æneous-black, elliptical, longer and broader than the thorax. Legs tawny. Wings cinereous; veins tawny; humerus longer than the

ulna; radius shorter than the ulna; cubitus nearly half the length of the radius; stigma small. Length of the body 1¼ line.

EULOPHUS DIVISUS. *Fœm.*—Æneo-viridis, gracilis; caput thorace latius; antennæ fuscæ, extrorsum crassiores, thoraci æquilongæ, articulo 1o luteo apice fusco, clava lanceolata; scutum antice attenuatum; parapsidum suturæ indeterminatæ; metathorax tricarinatus, bene determinatus; abdomen longi-ellipticum, vix petiolatum, thorace brevius; pedes lutei; alæ diaphanæ, venis pallide testaceis, stigmata minimo.

Female.—Æneous-green, slender. Head broader than the thorax. Antennæ brown, as long as the thorax, slightly increasing in thickness towards the tips; first joint luteous, brown towards the tip; second rather short; third and three following linear, successively decreasing in length; club lanceolate, much longer than the sixth joint. Prothorax very short. Scutum attenuated in front; sutures of the parapsides very indistinct. Metathorax well developed, with three keels. Abdomen elongate-elliptical, hardly petiolated, shorter than the thorax. Legs luteous. Wings pellucid; veins pale testaceous; ulna very much longer than the humerus; radius less than half the length of the ulna; stigma very small. Length of the body ⅘ line.

EULOPHUS ENTEDONOIDES. *Mas.*—Aureo-viridis; antennæ nigræ, filiformes, clava lanceolata; parapsidum suturæ bene determinatæ; metathorax bene determinatus; abdomen planum, subovatum, subpetiolatum, thorace multo brevius; pedes flavi; alæ anticæ subcinereæ, venis pallidissime testaceis, stigmate minimo.

Male.—Gilded green. Head a little broader than the thorax. Antennæ black, filiform; second joint subcyathiform; third and three following linear, successively and slightly decreasing in length; club lanceolate, very much longer than the sixth joint. Prothorax very short. Sutures of the parapsides strongly marked. Metathorax much developed. Abdomen somewhat oval, flat, slightly petiolated, much shorter than the thorax. Legs yellow. Wings slightly cinereous; veins very pale testaceous; ulna very much longer than the humerus; radius about half the length of the humerus; cubitus descending rather abruptly towards the disk; stigma very small. Length of the body ¾ line.

EULOPHUS CENTRALIS. *Mas et fœm.*—Læte viridis; antennæ fuscæ, thoraci æquilongæ, maris filiformes, fœm. subclavatæ; parapsidum suturæ bene determinatæ; abdomen maris longi-ovatum, fœm. ellipticum; thorace brevius; pedes flavi; alæ anticæ plaga discali fusca.

Male and female.—Bright green, in structure like E. entedonoides. Head a little broader than the thorax. Antennæ brown, as long as the thorax, filiform in the male, subclavate in the female. Sutures of the parapsides strongly marked. Abdomen elongate-oval in the male, elliptical in the female, shorter than the thorax. Legs yellow. Wings pellucid. Fore wings with a large or very large brown patch in the disk; veins pale testaceous. Length of the body ⅔ line.

EULOPHUS MACULIPENNIS. *Fœm.*—Viridis, gracilis, æneo cupreoque varius, antennæ nigræ, filiformes, articulo 1o flavo apice nigro, 5o 6oque flavis; prothorax et metathorax brevis; parapsidum suturæ bene determinatæ; abdomen sessile, longi-fusiforme, depressum, apice compressum stylatum; pedes lutei, femoribus basi fuscis; alæ anticæ albæ, fascia informi furcata maculisque quinque fuscis.

Female.—Green, slender, varied with æneous and cupreous. Head a little broader than the thorax. Antennæ black, filiform, slender; first joint yellow, very long, black towards the tip; second clavate; third and three following successively decreasing in length; fifth and sixth yellow; club lanceolate, about twice the length of the sixth joint. Prothorax and metathorax short. Sutures of the parapsides well defined. Paraptera far apart. Abdomen sessile, elongate-fusiform, depressed, compressed and stylate at the tip. Legs luteous; femora brown towards the base. Wings white. Fore wings with two brown spots near the base, with an irregular and interrupted brown band which is forked in front, and with three exterior marginal brown spots; veins brown; ulna much longer than the humerus; radius short; cubitus shorter than the radius, descending nearly directly towards the disk; stigma small. Length of the body ¾ line.

I believe that I have seen a British specimen of this species in the collection of the late John Curtis, which collection is now in Australia.

DIGLYPHUS CLAVICORNIS. *Fœm.*—Aureo-viridis, gracilis; caput thoraci æquilatum; antennæ nigræ, clavatæ, septem-articulatæ, thorace multo breviores, clava lanceolata; scutum antice attenuatum; parapsidum suturæ indeterminatæ; scutellum bisulcatum; metathorax bene determinatus; abdomen lineare, apice conicum, thorace paullo longius; pedes nigri, femoribus apice tibiisque basi flavo-albis, tibiis apice tarsisque pallide flavis, tibiis tarsisque anticis sordide flavis, illis fusco vittatis; alæ diaphanæ, venis sordide albidis, stigmate minimo.

Female.—Gilded green, slender. Head as broad as the thorax. Antennæ black, clavate, seven-jointed, much shorter than the thorax;

second joint elongate-cyathiform; third and fourth nearly equal: club lanceolate, much broader than the fourth joint and more than twice its length. Prothorax very short. Scutum somewhat attenuated in front; sutures of the parapsides indistinct. Scutellum with two furrows. Metathorax well developed. Abdomen linear, conical at the tip, a little longer than the thorax. Femora and four posterior tibiæ black, the former yellowish white at the tips, the latter yellowish white at the base; tibiæ towards the tips and tarsi pale yellow, tips of the latter brown; fore tibiæ and fore tarsi dingy yellow, the former striped with brown, the latter with brown tips. Wings pellucid; veins dingy whitish; ulna longer than the humerus; radius shorter than the ulna; stigma very small. Length of the body ¾ line.

EPICLERUS FEMORALIS. *Mas et fœm.*—Viridis aut cupreus; caput thorace latius; antennæ nigræ, graciles, thorace multo breviores, maris filiformes, fœm. clavatæ; prothorax brevis; parapsidum suturæ conspicuæ; metathorax bene determinatus; pedes rufescentes, femoribus basi nigris; alæ diaphanæ; fusco venosæ.

Male and female.—Green or cupreous. Head and thorax finely squamous, with some white hairs. Head broader than the thorax. Antennæ black, slender, much shorter than the thorax, filiform in the male, clavate in the female; club elongate-conical in the male, conical in the female, about twice the length of the preceding joint. Prothorax short. Sutures of the parapsides distinct, far apart. Scutellum rather long. Metathorax well developed. Abdomen subpetiolated, elliptical, shorter than the thorax. Legs reddish; femora black towards the base; tips of the tarsi black. Wings colourless; veins brown; ulna as long as the humerus; radius nearly half the length of the ulna; cubitus very short; stigma small. Length of the body ½—⅔ line.

ENTEDON INTAMINATUS. *Fœm.*—Aureo-viridis, gracilis; caput antice et apud oculos luteum, thorace paullo latius; antennæ fuscæ, filiformes, 8-articulatæ, articulo 1o luteo apice fusco; prothorax brevis, conicus; scutum longiusculum, parapsidum suturis bene determinatis; scutellum bicarinatum; metathorax sat longus; pedes flavi; alæ diaphanæ, venis flavis, stigmate minimo.

Female.—Gilded green, slender. Head a little broader than the thorax, luteous in front and about the eyes. Antennæ brown, filiform, slender, 8-jointed; first joint luteous, brown at the tip; second clavate; third, fourth and fifth linear, successively decreasing in length; club lanceolate, more than twice the length of the fifth joint. Prothorax short, conical. Scutum elongate; sutures of parapsides well defined. Scutellum with two distinct keels. Metathorax elongate. Legs yellow. Wings quite pellucid; veins yellow;

ulna very much longer than the humerus; radius rudimentary; cubitus very short; stigma very small. Length of the body 1½ line.

TETRASTICHUS MADERÆ. *Mas.*—Viridi-niger; caput thorace paullo latius; antennæ 9-articulatæ, nigræ, filiformes, setulosæ, thorace longiores; prothorax et metathorax breves; scutum subsulcatum; scutellum bicarinatum; abdomen sessile, fusiforme, thorace brevius; pedes nigri, genubus tarsisque obscure fulvis, tibiis anticis basi apiceque fulvis; alæ subcinereæ, venis fuscis, cubito stigmateque fulvis. *Fœm.*—Antennæ 8-articulatæ, thoraci æquilongæ; abdomen cyaneo-viride, ellipticum; tibiæ anticæ, genua tarsique lutea.

Male.—Greenish black. Head short, a little broader than the thorax. Antennæ black, filiform, 9-jointed, longer than the thorax; first joint fusiform; second elongate cyathiform; third and three following linear, setulose, nearly equal; club lanceolate, much more than twice the length of the sixth joint. Prothorax and metathorax short. Scutum large, with a slight longitudinal furrow. Scutellum with two well-defined parallel keels. Abdomen sessile, fusiform, shorter than the thorax. Legs black; knees and tarsi dark tawny; fore tibiæ tawny at the base and at the tips. Wings slightly cinereous; veins brown; ulna very much longer than the humerus; radius rudimentary; cubitus and stigma tawny; cubitus about one-sixth of the length of the ulna. Antennæ 8-jointed, as long as the thorax; third, fourth and fifth joints nearly equal; club lanceolate, more than twice the length of the fifth joint. Abdomen elliptical, bluish green. Fore tibiæ, knees and tarsi luteous, the latter brown at the tips. Length of the body ⅙ line.

TETRASTICHUS SOCIUS. *Mas.*—Niger; antennæ testaceæ, clavatæ, thoraci æquilongæ; prothorax et metathorax brevissimi; parapsidum suturæ bene determinatæ; pedes pallide testacei, femoribus posticis nigris apice testaceis; alæ anticæ fimbriatæ, valde setulosæ. *Fœm.*—Abdomen longi-ovatum, subtus carinatum.

Male.—Black. Head as broad as the thorax. Antennæ testaceous, clavate, as long as the thorax; second joint linear, as long as the third; fourth shorter than the third; fifth shorter than the fourth; club lanceolate, broader than the fifth joint and full thrice its length. Prothorax and metathorax very short. Sutures of the parapsides strongly marked. Abdomen tapering from the base to the tip. Legs pale testaceous; hind femora black, pale testaceous at the tips. Wings pellucid. Fore wings very pubescent, fringed; veins pale testaceous, setulose; ulna longer than the humerus; radius none; cubitus rather short; stigma very small. *Female.*—Abdomen

elongate-oval, keeled beneath, longer than that of the male. Length $\frac{1}{3}$—$\frac{1}{2}$ line.

TETRASTICHUS SUBPICTUS. *Fœm.*—Æneus; caput thoraci æquilatum, apud oculos flavum; antennæ testaceæ, clavatæ, thorace non longiores, articulis 1o 2oque nigris, 2o apice testaceo, clava acuta; prothorax postice flavo fasciatus; scutum flavo marginatum; parapsidum suturæ bene determinatæ; abdomen thorace longius; pedes flavi, femoribus posticis nigris apice flavis; alæ diaphanæ, venis pallidis, stigmate minimo.

Female.—Æneous. Head as broad as the thorax, yellow about the eyes. Antennæ testaceous, clavate, not longer than the thorax; first and second joints black; second testaceous at the tip; club elongate-oval, acute at the tip, much broader than the fifth joint, and more than twice its length. Prothorax very short, with a yellow hind band. Scutum bordered with yellow on the hind side and along the sutures of the parapsides, which are well defined; a yellow streak on each side of the scutellum. Abdomen elongate-elliptical, longer than the thorax. Legs yellow; hind femora black, yellow towards the tips. Wings pellucid; veins pale; ulna much longer than the humerus; radius none; stigma very small. Length of the body $\frac{2}{3}$—1 line.

TETRASTICHUS PERPUSILLUS. *Fœm.*—Æneo-niger; antennæ clavatæ, sordide testaceæ, thorace breviores; prothorax brevissimus; parapsidum suturæ bene determinatæ; metathorax subcarinatus; abdomen sessile, fusiforme, thorace brevius; pedes testacei; alæ anticæ subcinereæ, venis fuscescentibus.

Female.—Æneous black. Head a little broader than the thorax. Antennæ dingy testaceous, clavate, shorter than the thorax; club lanceolate, much broader than the preceding joint, and thrice its length. Prothorax very short. Sutures of the parapsides well defined. Metathorax with a slight keel. Abdomen sessile, fusiform, shorter than the thorax. Legs testaceous. Fore wings slightly cinereous; veins brownish; ulna longer than the humerus; radius none; cubitus rather short; stigma very small. Length of the body $\frac{1}{4}$ line.

The Notes on Chalcidiæ are here concluded. Some alterations are required in the arrangement of the families, and the genera and their respective species have yet to be examined in detail; but it is not likely that an opportunity will occur for publication thereon.